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Big Sky Clearwater

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If you have any ideas or information that you would like to pass along to other people involved in the water and wastewater field, please don't hesitate to contact the Water Quality Bureau. This publication welcomes articles of interest and random pieces of information regarding anything to do with water.

An article may consist of your own thoughts and ideas about something you may have experienced. Perhaps such information could help someone else in their day-to-day work. It could also be a technical article that is developed from research information and library resource material. If it has to do with water and you think it may be of interest, give us a call at (406) 444-2406.

If you do not wish to continue receiving this publication, please send us your name and address so that we may remove your name from our mailing list...thanks.

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JUNE 29, 1993 --- THE DEADLINE IS NEARING!

by John Camden, WQB

New regulations will soon be affecting surface water treatment plants. Along with the regulations, WQB has developed some new forms that correlate with the new regulations. I will highlight each aspect of the changes taking place.

First, a surface water supply system must have a continuous chlorine monitor (analyzer) and record the lowest chlorine residual value entering the distribution each day. If there is failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

Next, a water supply system must monitor and record turbidity measurements of representative samples of the system's filtered water (clearwell effluent) and individual filter effluent at least every four hours that the system serves water to the public. The goal for both sets of readings is to have the turbidity readings at 0.5 NTU (for slow sand filtration the max. NTU is 1.0) or less, 95% of the time. The percentage is obtained by the number of turbidity measurements less than or equal to the specified NTU limit (B), divided by the number of turbidity measurements taken (A) times 100. The form will say B/A x 100 = %. Confused! The forms will help to explain all the data that will be needed.

Grab sampling is okay as long as the samples are collected every four hours the plant operates. Continuous turbidity monitoring may be substituted for grab sampling if the supplier validates the continuous measurement-turbidimeter using a primary turbidity standard or a bench-top turbidimeter at least monthly. The number of samples to be collected for those plants that start and stop automatically is set up in the following format:

Total Hours of Operation/Day	Number of Samples Required
0 - 4	1
4 - 8	2
8 - 12	3
12 - 16	4
16 - 20	5
20 - 24	6

DHES will be assisting water systems with a turbidity monitoring form so that monthly totals can be calculated.

After three months and two workshops the new reporting forms have been refined to four forms from a previous seven forms. The forms are titled: 1) "Daily Data of Finished Clearwell Water Quality", 2) "Individual Filter Turbidity Compliance", 3) "CT Determination for Surface Water Systems" and, 4) "CT Compliance Report and Distribution System Disinfection Residual Data for Surface Water Systems." The second mentioned form will have a sign-off line for In-Line calibration monthly and Bench-Top calibration quarterly. CT's will be discussed in another article by Marc Golz.

The Water Quality Bureau staff strongly suggest operators of surface water treatment plants attend the seminars entitled: "Surface Water Treatment, Reporting and Monitoring" in Miles City, Glendive, and Havre where these new requirements will be discussed in detail.

If you have any questions please call me at 444-4549.

We're in it together...

by Bill Bahr, WQB

It's an interesting, but challenging profession we share...that of protecting Montana's waters. We preserve it for future Montanans and we protect those of today from a wide variety of threats, both recognized and not. The stated tasks of the Clean Water Act and the Safe Drinking Water Act are to protect and preserve our waters for a variety of uses and to give us water fit to drink.

If part of this immense responsibility is your job, then you'll probably understand how it compares to the unfortunate fisherman who went out ice fishing one day. Well, taking things a bit too literally, he caught about 50 pounds...of ice, and nearly drowned trying to cook it up. If it sometimes feels like we've got a task too large or too complex to manage, and with too few resources at our command, and too few supporters at times, just remember...we're in it together.

A diverse group of professionals made an attempt to define the perfect water or wastewater operator last May. See if you can recognize yourself and/or your abilities in this profile. (Operators should wear a blue body suit, a red cape and have a big red "S" on their chests.) Just kidding, but the list of skills, abilities and knowledge we ought to have is pretty impressive.

By law we must be certified, so we should know the laws. We should be able to explain the **purpose** of environmental health and protection. About now you ask, "What **are** the rules and regulations that **I, a Montana Operator**, need to know?" Surprise...it all starts with the Clean Water Act and the Safe Drinking Water Act. We should be able to summarize these two Acts. No problem, right? Just obtain a copy and dig in.

We need to recognize the consequences of wastewater discharges and the acute and chronic effects of contaminated drinking water. It's hard to argue with that. That's why we do what we do. To help us do that, we need to keep the regulations on hand and be able to explain the purpose of them. To comply with the **intent** of the rules, we need to analyze and apply all the pertinent and related regulations. Which means, we first have to **read** them.

Everybody who has read the CWA, the SDWA, your MPDES permit, the proposed drinking water rules, and all the rest, raise your hand. Everybody who understands them well enough to explain them to others keep your hand up. Let's see now, that's "one, two, three,..."

But, seriously, we are supposed to be able to explain compliance standards and communicate compliance requirements. We should understand water quality standards well enough to describe them to others, especially in our own communities. Do you know how the Maximum Contaminant Levels for drinking water came to be? Can you explain the NPDES program and anti- or nondegradation? Attend training, ask for the rules and read them, or request Water Quality Bureau assistance and you'll be able to answer **"yes"** to these questions.

We need to maintain certification. Why? (P.S., it's the law.) It also guarantees that you have leaped certain hurdles like tests and school and job experience. We also understand the importance of monitoring and reporting. Besides being the law, it's part of our water protection, preservation, improvement plan. To whom do you report? Who needs to know the results of your sampling and testing program? Monitoring must meet standards specified in the

Acts; reports must be accurate, timely, and in the hands of the right people.

While we're at it, we must also keep records on file, not only for reporting, but to determine system performance and compliance. Our records will then help us anticipate and evaluate potential problems and risks. In terms of our responsibilities to the health and protection of the environment and all the regulations, we have a big job to do.

One important aspect of our profession is to be **honest** with what happens in our systems and treatment plants. If we recognize a violation of the standards, we **have** to report it. There are rules for making appropriate public notification. What we do affects every Montana citizen, so we cannot afford to be lax in performing the duties required of us by law.

The basis for all the regulations, laws and rules is the protection of water for all its intended uses. Our own lives are affected by the performance of plants and operators. This is a profession with heavy responsibilities. We've caught our 50 pounds of ice. Let's not drown as we try to serve it up for dinner.

Helping Montana's operators understand and meet the requirements of the job, are the dedicated professionals of the Water Quality Bureau. Let's face it, we have a lot to do, and do it well. We must not only administer the frontline defense of Montana's waters, but also:

- do it **Safely**;
- know a good deal of **Math and Science**;
- be good at **Operating and Maintaining** our plants and testing equipment;
- have good **Communication, Administrative, and Personal and Professional** skills;
- be available at **all** times (or have suitable backup);
- take reasonably difficult examinations;
- be (for the most part) an underpaid, underappreciated civil servant;
- work, sometimes, in poorly designed, out-of-date plants;
- and, perform these tasks, analyze these situations, respond to the public's indifference or indignation, with enthusiasm and a smile.

The cooperation between Montana's operators and Montana's Water Quality Bureau people is the cornerstone upon which Montana's water and health protection is built. Read on to discover what these folks do to make high standards of water quality possible.

The **Drinking Water/Subdivision** program:

- Administers the **Operator Certification** program. Montana law (Title 37, Chapter 42, MCA and Title 16, Chapter 18, ARM) says that the operators in responsible charge of water distribution, water treatment, and wastewater treatment systems serving ten or more connections must be certified through education, examination, and experience.

- Reviews **Subdivisions** of land less than 20 acres for the adequacy of water supply, wastewater treatment and surface drainage. (Title 76, Chapter 4 and Title 16, Chapter 16, ARM)

- Regulates all **Public Water Supplies (PWS)**. This group provides engineering and field services to the PWS in Montana. They have primacy for administration of the Federal Safe Drinking Water Act. (PL 93-523) As such, they enforce drinking water regulations, provide technical assistance, train PWS operators and managers, respond to contamination incidents, review plans for improvements to PWS and wastewater systems to insure long-term viability, and give general assistance to the public.

- And, all **Trailer Courts, Campgrounds and Swimming Pools** are regulated and licensed to ensure that departmental public health and safety regulations are adhered to.

The **Municipal Wastewater Assistance Section:**

- Provides **Financial and Technical** assistance to Montana communities to build wastewater treatment and collection facilities. The Clean Water Act created the EPA Construction Grants Program administered by this section under delegated agreement from the EPA. Currently the State Revolving Fund program is administered by the section.

- Reviews needs of communities for the annual **Project Priority List**. This project determines an order of need according to the severity of public health hazards or environmental problems.

- Directs **Operator/Administrator Training and Plant Inspection**. The section's engineers conduct Comprehensive Performance Evaluations and schedule on-site plant inspection/operation evaluations. The program oversees and supports the Montana Environmental Training Center as well as other statewide training activities.

- Will begin a **Pollution Prevention** program to develop and implement pilot programs which will prevent new sources of pollution and encourage waste minimization at wastewater treatment facilities.

The **Permits/Groundwater Section**:

- Conducts the **Surface Water Permits/Compliance Program** to control the quantity and quality of wastes discharged to state waters through MPDES permits, monitoring reports review, and compliance inspections. Wastes monitored include oil and hazardous material spills. Assistance is provided for investigation, follow-up and enforcement of water pollution incidents.

- Assists the EPA in directing the **Pretreatment Program** which controls the quality and quantity of industrial discharges to Publicly Owned Treatment Works (POTWs) through a permit system.

- Will direct **Sludge Management** plans for all MPDES permitted facilities.

- Is processing the huge number of **Stormwater Discharge** permits. Under the 1987 Federal Water Quality Act, the state-delegated NPDES program is investigating and preparing permit standards for the thousands of industries and municipalities meeting stormwater industrial activity definitions.

- The **Groundwater Program** is involved with establishing nondegradation regulations, issuing groundwater discharge permits, mining and milling operations, investigation and oversight of groundwater complaints and spill cleanups, and integration of groundwater and hazardous materials issues with other bureau sections. This section works with other appropriate state agencies as well.

The **Ecosystems Management Section:**

- Directs the **Monitoring, Assessment and Planning Program**, involving water quality programs on the Clark Fork River, the Flathead Lake Basin, Swan Lake, other Montana lakes, statewide watershed studies, and including updating the Waterbody Tracking System, completing the Ecoregion Reference Stream Study, and beginning a Wetlands and Biocriteria project.

- Includes the **Nonpoint Source Control/Wetlands and Monitoring Program**. This group supports and participates in a myriad of studies, assessments, programs, cooperatives, etc. that are working to evaluate, enumerate and educate about the many nonpoint pollution sources in Montana. (Write in for the list.)

The **Technical Studies and Support Section:**

- Provides **Scientific Support** to the Bureau in standards development/interpretation, permit limits, computer/data management systems, and **Technical Support** for reviewing and tracking developments which may affect surface or groundwater quality.
- Reviews development projects which fall under the state water quality statutes affecting **Nondegradation**. Many of these include mining projects, so the section has a liaison with the Department of State Lands. Through the Montana Environmental Policy Act, reviews other developments which may affect water quality.
- Supports the **Computer Systems Network** of the Bureau and intra-department state networks, and coordinates with a variety of data systems used by the EPA and other agencies. Supports the Drinking Water section in tracking all the new drinking water requirements and long-range data management plan. Provides research in support of State/Environmental Protection Agency Data Management (SEDM), the Global Positioning Systems (GPS), and Geographic Information Systems (GIS).

The **Enforcement and Legal Support Section:**

- Investigates reported **Violations** of the statutes administered within the Bureau and initiates **Enforcement Actions** to remedy documented violations. This section provides formal enforcement, litigation, technical administrative rule, and legal opinion support to all programs within the bureau.

The **Regional Offices:**

- Extend the many services of the Water Quality Bureau to the rest of the state. They are located in Billings and Polson.

Those of you who managed to stay with me so far in the examination of this mission "to protect, maintain, and improve the quality of Montana waters," please relax, take a deep breath, and take comfort in the fact that I'm almost done. If this seems exhaustive, remember that I am giving you only the briefest overview of operator duties, skills and needs, and just the skeletal structure of the Water Quality Bureau. I simply cannot write in a few pages, or take the amount of time it would require to list all the things that dedicated operators do in protecting Montanans. To fully reveal the legal responsibilities necessary to insure water quality in Montana would take a superhuman effort.

It is essential that the state's operators and the state's Water Quality Bureau cooperate. This cannot be said often enough or shouted loud enough. This comforting message --- the success of these groups in their efforts to protect public health --- needs to be spread throughout the state.

IT'S OUR WATER...AND WE'RE IN IT TOGETHER.

HOW SAFE IS YOUR WORKPLACE ??

by Jerry D. Wright, Editor
Safety & Health Bulletin

Have you ever wondered when the last time your workplace had a safety inspector come out and check for compliance with applicable regulations? Have you ever thought about how you would react if your workplace caught on fire? Better yet, has your workplace developed emergency procedures to use in the event a fire breaks out, or some other disaster that places lives at risk? These are all questions which should be easily answered by every employee, but many are not. In fact, many employees are killed each year simply because employers do not provide employees with a safe working environment.

Let's remember for a moment the tragedy at the Hamlet, North Carolina, Imperial Products Plant. Here is a perfect example of one of the many plants out there that was waiting for a tragedy to occur because proper safety procedure methods were not used. The major difference in this case, however, is that twenty-five employees died, all of whom were fighting to get out of locked exit doors. In eleven years of operation, not one inspector from the local, state, or federal agency ever checked on the physical safety of the workers. The only inspections held were done by the Food & Drug Administration to ensure the food was safe for human consumption. This tragic accident has reinforced to the entire country that there is a definite need for stronger workplace safety.

Granted that this accident happened at a food processing plant, many wastewater treatment facilities are also ripe for tragedy. Do not take your workplace safety for granted. If you discover a situation that may present an unsafe condition, bring it to the attention of your safety coordinator, plant manager, or someone else who can alleviate the problem. The fact is that many public agencies do not have OSHA coverage, not even to call a safety inspector, so it's up to you to get involved whenever the need arises. Remember, your concern may save someone else's life. I'm sure those twenty-five workers at the Hamlet, N.C. plant wish someone had.

*Reprinted from **Safety & Health Bulletin**, Fall/Winter 1991 issue, published by Water Environment Federation, with permission by Jerry D. Wright, Editor.*

STORM WATER . . . You Can't Run Away From Runoff

by Amanda Domino, WQB

In November of 1990, the Environmental Protection Agency (EPA) adopted final regulations pertaining to storm water discharges associated with industrial activity. The new regulations became effective nationwide as of October 1, 1992. Presently, storm water discharges from industries and municipalities often flow untreated into the nearest surface water, (i.e., creeks, rivers). Through monitoring these storm water discharges, water quality problems will be defined. The new regulations, integrated with the use of Best Management Practices (BMP's), can be applied to alleviate water quality problems, contributing to the improvement of many of the nation's surface water bodies.

Several different industries are required to apply for storm water discharge permits. A permit is needed provided that storm water (runoff from rain or snow melt) leaves an industrial site as a point source and can discharge to surface waters either directly or through a drainage system or storm sewer. A point source discharge is defined as any natural or manmade conveyance which carries storm water to surface waters. For some industries, a permit is required only if the storm water is exposed to raw materials, intermediate products, finished products, wastes, or material handling equipment.

The state of Montana has developed three classifications, with a permit to accompany each category, to comply with the new storm water regulations. The first category contains those industrial facilities and operations involved in industrial activity including: manufacturing facilities; hazardous waste treatment, storage, or disposal facilities; landfills, land application sites, and open dumps that receive industrial wastes; recycling facilities classified as Standard Industrial Classification (SIC) codes 5015 and 5093. These codes include metal scrapyards, battery reclaimers, salvage yards, and automobile yards; steam electric generating facilities, including coal handling sites; and, transportation facilities. The second permit category includes those industrial facilities and operations involving construction activities. Finally, the third permit category is comprised of the oil and gas extraction and mining industries.

All industries, whether or not they are affected by these new storm water discharge regulations, can contribute to the protection of Montana's water quality by incorporating some good-housekeeping practices into their businesses. Carefully loading and unloading materials outdoors and properly storing materials outdoors so that storm water doesn't come into contact with them can both contribute to the protection of our state waters. Managers can train employees in the proper procedures for preventing spills and in proper procedures for cleaning up spills. Lastly, when washing equipment outdoors, make certain wash water doesn't discharge into local storm drains. Wash water can contain pollutants such as sediment, oil and grease, and other chemicals that potentially could wash via storm drain systems into nearby surface waters.

The state of Montana's storm water runoff program hopes to work with the affected industries to help them comply with these new federal regulations. The end result desired is to create a preventative program.

The use of Good-housekeeping practices, Best Management Practices and communication between the Water Quality Bureau and the affected industries will help to facilitate a smooth and productive system. The new Storm Water Runoff Program can be valuable in reducing the nation's water quality problems.

PREVENTIVE MAINTENANCE

by Gary D. Rhoads, Operations Manager
Western Berks Water Authority

Have you ever had a V-belt break unexpectedly? Was a valve difficult to close (or open) when needed? Did you drain a filter only to see that the media is inches or feet below where it should be? These are just some of the problems which can occur without a preventive maintenance program.

The benefits of a preventive maintenance program are manifold. The failures mentioned each have a way of happening at the least opportune time. It could be pouring rain, drifting snow, or unexpected raw water quality deterioration which are going to be the times when equipment deficiencies present themselves and require immediate, unscheduled servicing.

By inspecting equipment and components on a regular basis, problems can be detected BEFORE an unexpected failure has you doing overtime on your wedding anniversary or the night of your club's big meeting. Yes, if ever there was a time when you wanted things to go smoothly, that's the time that the small, insignificant pieces of plant equipment can behave their worst.

A preventive maintenance program can be as simple as a notebook listing inspection items to do regularly. The system could be as complex as a software program on a PC able to track work orders, inventory, and employee records. Whichever system is selected, if utilized properly, it can keep call-outs and late quits to a minimum.

Any preventive maintenance system must be flexible; it must be able to grow, adapt, and be modified. Equipment within a plant changes. Operators and maintenance personnel will see that some previously established routines will need to be accomplished more or less frequently. Many times schedules published by equipment manufacturers are guidelines. It could be found that a certain piece of equipment has an especially vulnerable component which requires more frequent inspection. Likewise, certain tasks such as filter replacements or lubrication intervals could be extended. Remember, a great many equipment failures have been the result of over-lubrication.

One system which worked well for us prior to using a computer program was a rotary file card index. Cards were made up for each piece of equipment. The cards listed the months down the left-hand column and weeks one through four across the top row. Required P/M tasks were identified in the appropriate block of this matrix. For example, monthly inspections might be listed for the second week of each month. This was done by placing "M" in each month's block in the second week column. Quarterly, semiannual, and annual tasks were similarly identified.

For a sort of cross-reference capability, cards were also made up for each month. Equipment identification was placed down the left column. First, second, third, and fourth weeks were placed at the top of the right-hand columns. If the air compressor was scheduled for quarterly inspection during the second week of January, "Q" was placed in the appropriate column in the row for the air compressor. Cards were printed on which to show required tasks for each piece of equipment. A work order was made listing the work required. Documentation of the work completed consisted of filing the completed work orders in a notebook.

The above system worked quite well for a system which had gone for years doing essentially only breakdown or emergency type maintenance. It was tedious to have to hand-write work orders but it did serve to almost completely eliminate unplanned work.

Our water utility now uses a computerized preventive maintenance system.[1] This system allows for the scheduling, generating and printing of work orders. Historical data of previous work completed is readily available from archived files rather than having to leaf through a notebook. From records input to the program, it is possible to recall complete nameplate information on any piece of plant equipment. That means nameplates which get painted over, damaged, or are on a piece of distant equipment can be reviewed at any time for whatever information is desired.

After all this about computers, don't think that they are a prerequisite to having a good preventive maintenance program. Almost anything that a computer system does can be accomplished with a manual system. Any program is going to require research to determine necessary tasks and schedules. Preventive maintenance requires the support of all levels of staff and management. What may first appear to be unnecessary time spent on an operable piece of equipment could just be the time that a loose or corroded fitting was detected. It could be a few minutes spent during daylight which saves hours outside in the rain. It could even be the difference between having water go out to the consumer which meets all applicable standards or having poor quality water being delivered. Which would you rather have?

1) **Maint-Pac by Datastream Systems**

Gary D. Rhoads
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METC UPDATE

by Jan Boyle, METC Coordinator

Greetings!

What a great 1992 training year we had!! The Montana Environmental Training Center (METC) sponsored 30 workshops and seminars with a total of 755 in attendance (average per workshop was 25). And we found ourselves doing this training in 18 different locations throughout Montana! The METC van logged over 14,000 miles. No wonder this Coordinator gets "jet lag" every now and then! Some of the smaller rural communities were delighted to have us there to do training, and I was delighted to be there. There's just nothing like small-town hospitality! "Thanks" to Yellow Bay, Hamilton, Shelby, Glendive, Plentywood, Wolf Point, and Roundup! And, of course, who could forget Kalispell, Great Falls, Butte, Anaconda, Helena, Miles City, Missoula, Billings, Lewistown, Havre, and Glasgow (is that 18 yet?!) - "WHEW!" Thanks to all for their cooperation and generous help in getting these training workshops accomplished.

A few of the training highlights from 1992 include:

- ▸▸ Sixty-nine attendees at the **"Paying for Water and Sewer Improvements"** seminar in Billings. That is the largest number in attendance at any one seminar or workshop that we've held. The **"Dealing With Coliforms"** workshop in Missoula was a close second - 63 attended to find out about coliforms.

- ▸▸ METC invited Charlotte Benton from the National Environmental Training Association to instruct a **"Train-the-Trainer"** workshop. Invited trainers learned how to improve upon their environmental training skills and were offered the opportunity to become CETs - Certified Environmental Trainers. Four attendees did take the examination and complete the application process; three became CETs and one became an AET (Associate Environmental Trainer). Congratulations to Dana Audet, Wayne Robbins, Dick Watson, and Karen Sanchez!!

- ▸▸ METC's Advisory Board Members were invited to attend a **"Needs-to-Know"** workshop. The workshop was designed to be a facilitated brainstorming process to identify key concepts in developing a need-to-know approach to environmental training. Susan McMaster, a professional instructional specialist, facilitated this workshop which saw active participation by everyone who attended. The results of this brainstorming process were outlined by Ms. McMaster and made available to every attendee who could then make application of the material to their own specific focus - identifying training workshops, identifying a core of topics specific to just water and just wastewater, using it as a model to develop the need-to-know for water/wastewater administrators, or as a model used by the certification board to identify possible modifications to the certification examinations.

▸▸ Another really "neat" workshop in 1992 was the **"Phosphorus Removal"** workshop at Yellow Bay. Dr. Bill Oldham, Professor of Civil Engineering at the University of British Columbia, presented information on biological nutrient removal (BNR) including the history of BNR, biochemical explanation of phosphorus removal, and design parameters and operation of BNR plants. Dr. Oldham is world-renowned in this field of BNR, having been directly involved in the process design of several treatment plants in Canada, Australia, and the U.S.A. In fact, the newly-built Kalispell WWTP has used his expertise in the development of its phosphorus removal facility. METC was very fortunate, indeed, to have Dr. Oldham on board for this workshop. And what a nice guy, too!

What's coming up in 1993 at METC? Well, some workshops addressing the **Lead and Copper Rule** as it pertains to the Safe Drinking Water Act are being presented several times throughout the state. A **Communications** workshop should prove to be a valuable inclusion for operators, managers, and administrators toward building a better communication network between employees. This will be an active participation, hands-on session, too. It should be fun! How about that **Municipal Sludge Disposal** seminar that was postponed in 1992? Well, it's on for 1993. Some evening **math sessions** are scheduled along with some **safety sessions**, too.

All these workshops and more are listed in the 1993 Training Calendar for Water and Wastewater Professionals that is prepared, published, and distributed by METC. The 1993 calendar has a new look about it from past calendars. It includes information pages describing the various training organizations in Montana that offer environmental training, along with their logos. Most of you certified operators should have already received one of the calendars. If you have not, or you are someone who would like one, please contact me: Jan Boyle, METC Coordinator, at (406) 761-0417. I'll see that you receive a calendar but better hurry, as they're going fast! Let me know how you like the "new" look!

WHERE IS METC?? Well, let me tell you! You can find the Training Center Office (and Jan) at 1211 Northwest Bypass, Great Falls, Montana. It's the Great Falls Campus of Northern Montana College. Stop by for a visit!

Enjoy a Happy New Year!

Montana's Community Public Water Supplies

by Carole Mackin, WQB

Montana's community public water supplies (PWS) fall into two basic categories: those using surface water and those using groundwater. Some PWS use both but are classified according to which source supplies the majority of the water. There are 60 systems using primarily surface water and 620 systems using primarily groundwater.

The PWS can be placed in categories based on the number of people served. The smallest systems serve 10 to 100 people. This category has the largest number of community PWS. The largest systems serve more than 1,000 people. **Figure 1** shows the number of community PWS in each size category.

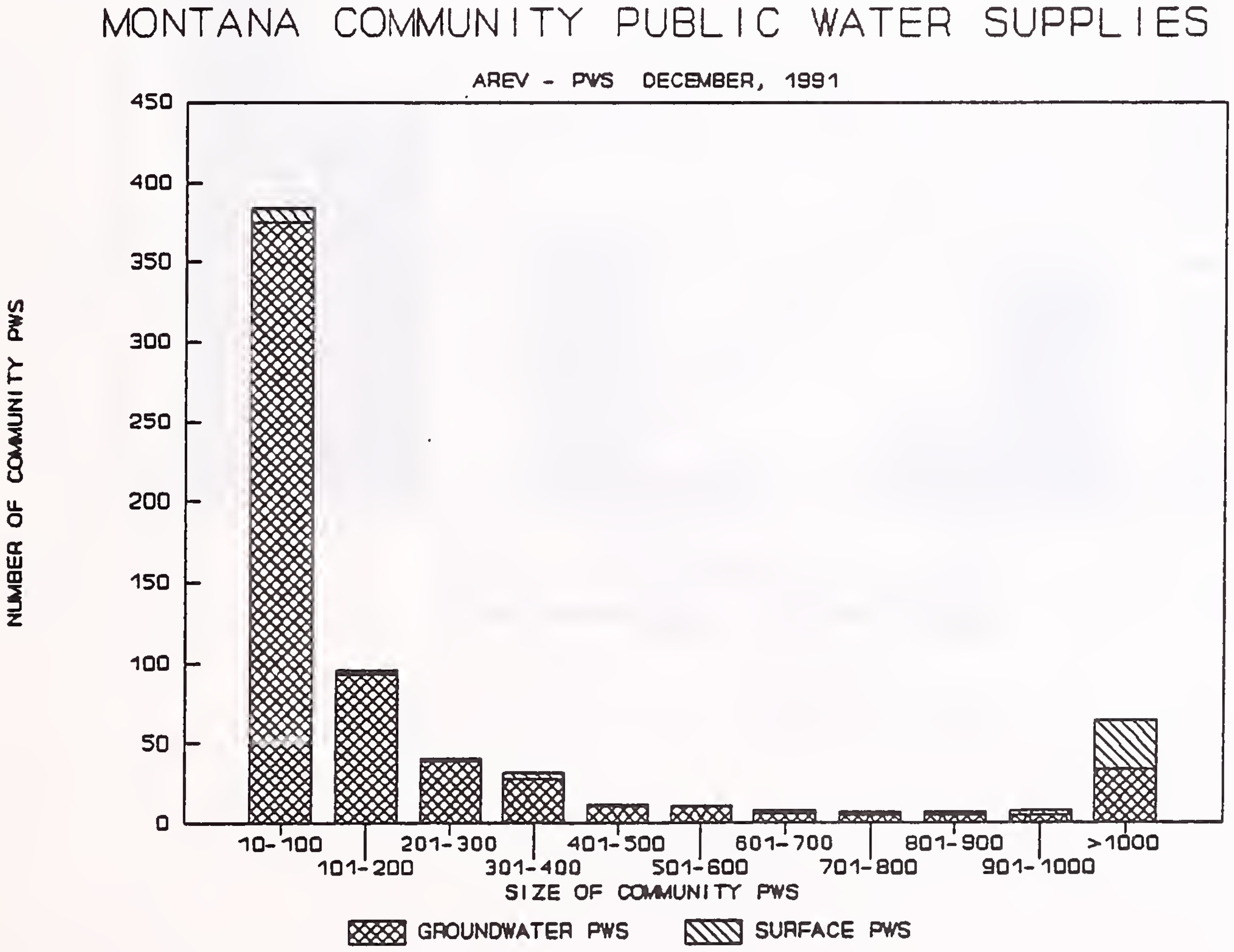


Figure 1

Another way of looking at the community PWS is to focus on the total number of people served by each size category. Montana's community PWS are either very large (over 10,000 people), or very small (1,000 people or less). Mid-size systems using groundwater are rather rare in Montana. **Figure 2** shows the distribution of total population in each size category.

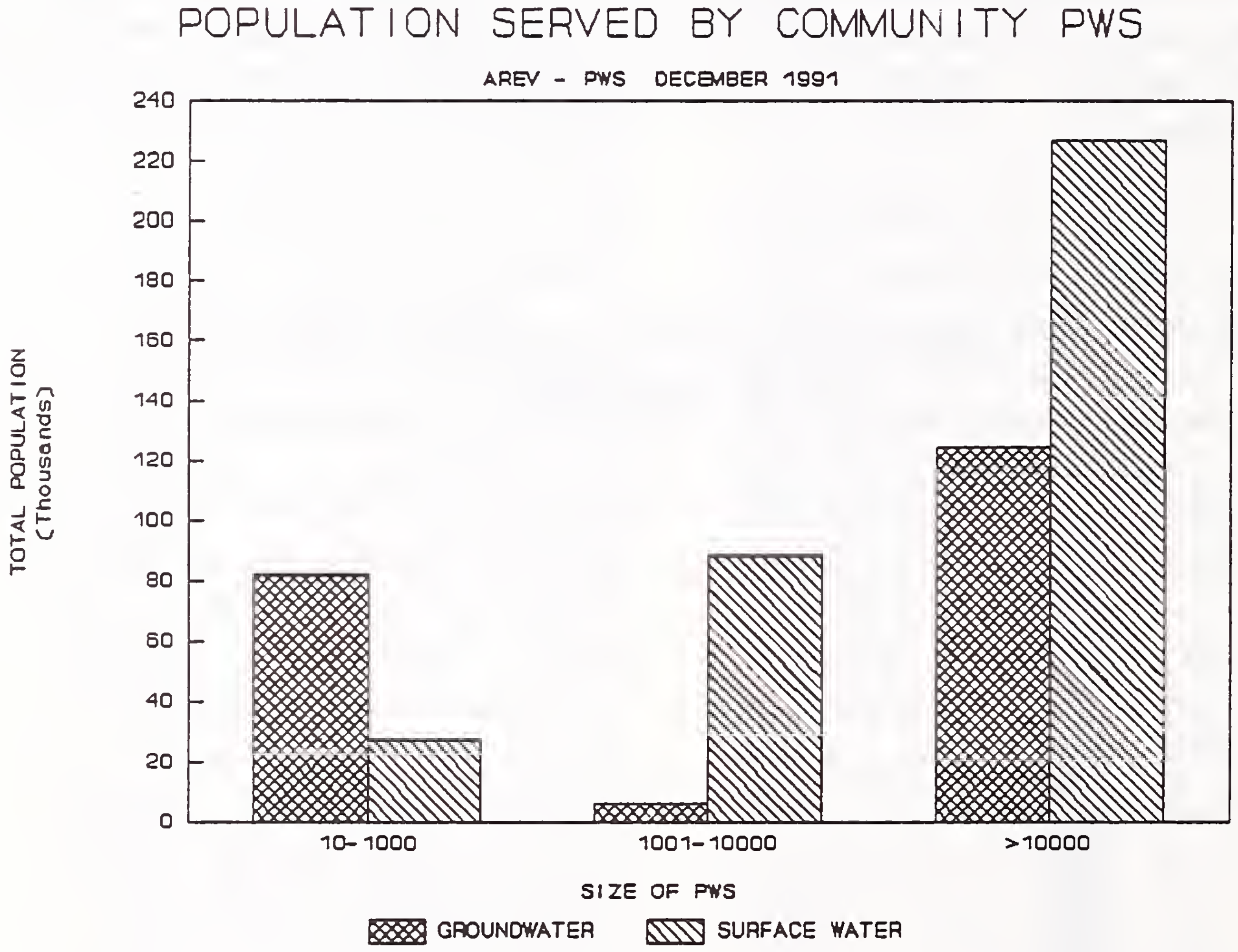


Figure 2

The Montana Wellhead Protection Program affects only those PWS using groundwater. Most of the non-community PWS use groundwater, and there are a total of 1,157 non-community PWS. About 87 percent of the community PWS use groundwater (this is 616 PWS of a total of 709, as of December 1992).

Those PWS using groundwater can be divided into several types according to the kind of organization that runs the PWS. **Figure 3** shows that only 21 percent of the PWS are associated with a local government. Trailer parks comprise the largest group and these are usually owner-operated.

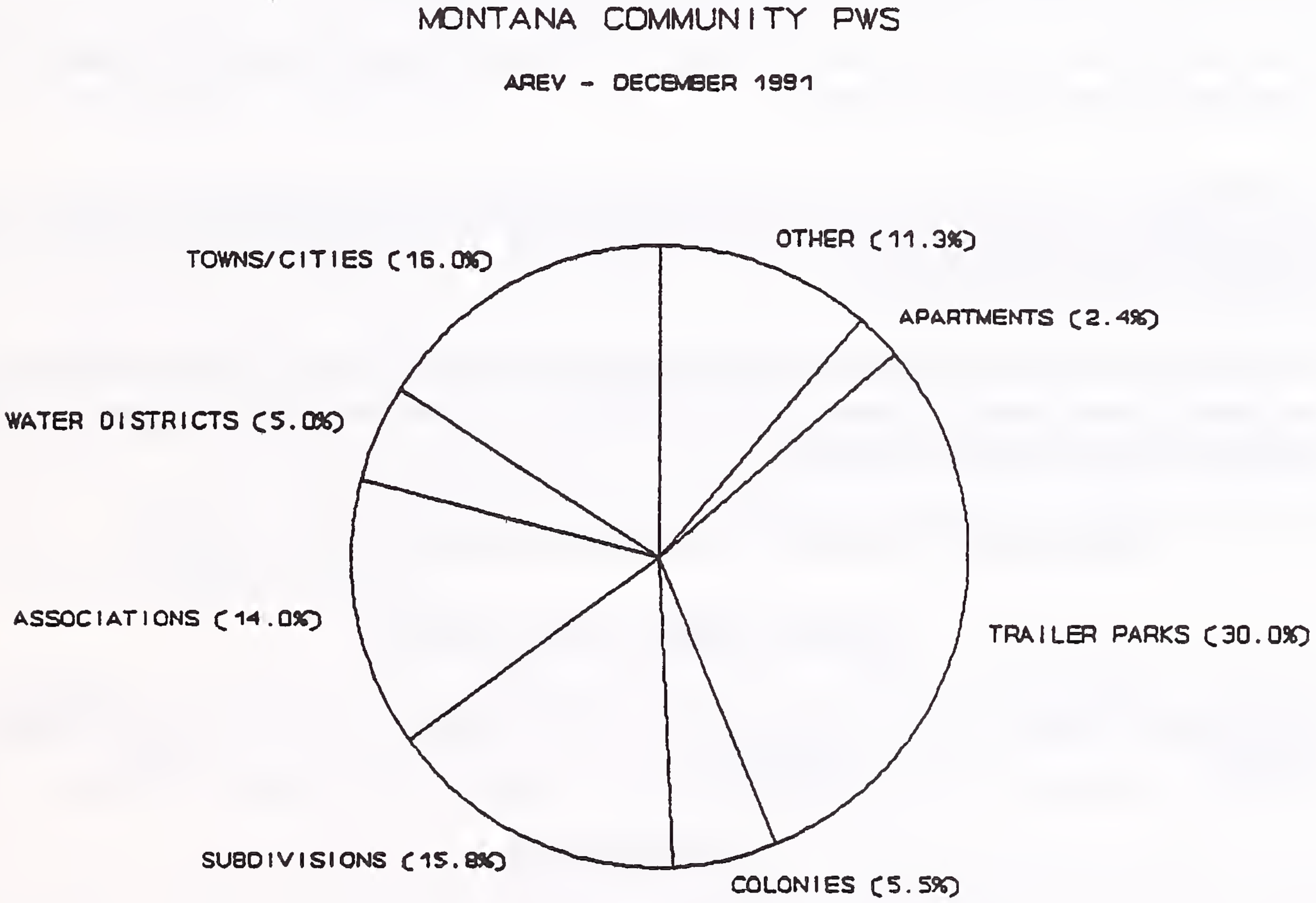


Figure 3

NATIONAL O & M
* EXCELLENCE AWARDS PROGRAM *

by Doris Roberts, Northern Montana College

Does your wastewater facility have a good to excellent operations and maintenance program? Have you initiated procedures at your facility that have resulted in consistent permit compliance? Do you have any innovative programs at your facility? Maybe you would be interested in applying for the U.S. EPA 1993 O & M Excellence Award.

Any publicly-owned wastewater treatment facility is eligible to be considered under the program. This includes tribal and federal facilities. Other requirements include:

1. The plant must have been operating for at least three (3) years.

2. Within the last three (3) years, the plant must not have been upgraded to meet secondary or advanced limits nor have gone through an expansion which exceeded the January 1, 1993 average flow capacity by 50 percent.

3. The plant must not have won the 1991 or 1992 National first place award or the 1992 National second place award.

4. To qualify for the Most Improved Plant category, the plant must have an average design flow capacity of less than 5.0 mgd and the improvements must be a result of onsite technical assistance.

5. To qualify for the Nondischarging category, the plant must not discharge to surface waters at any time. Plants with intermittent or seasonal discharges, however, are eligible for the other categories.

Categories for National O & M Excellence Awards Program

Average Design Flow Capacity

1.0 mgd or less	> 1.0 to < 10.0 mgd	> 10.0 mgd
Small	Medium	Large

Types of Plants

A. Secondary
B. Advanced
C. Nondischarging
D. Most Improved

If you have questions about the Awards Program or would like information on how to apply, please call Bill Bahr at the Water Quality Bureau (444-2406). The state has to submit the nomination packages to the regional EPA office by April 2, 1993. So, if you are interested in applying for an award, call Bill --- NOW!!!

FLATHEAD REGIONAL COMPOSTING FACILITY
GLACIER GOLD COMPOSTING PLANT
by Tom Slovarp, WQB

Many communities are in need of an environmentally acceptable way to dispose of biodegradable wastes such as municipal sewage sludge, septage, and manure, as well as yard wastes, such as leaves and tree trimmings. In order to address this need in the Flathead region, the American Timber Company, under the guidance of its consultant, Dr. Joseph C. Horvath of JCH Environmental Engineering, Inc., is proposing to build a composting facility for biodegradable wastes. Dr. Horvath has previously developed EKO-KOMPOST, INC., a composting operation in the Missoula area. The name of the proposed facility is the Glacier Gold Composting Plant and it would be located at the sawmill site of the American Timber Company, two miles south of Olney, Montana, off U.S. Highway #93, approximately 16 miles northwest of Whitefish, Montana.

American Timber Company and JCH have been working with local authorities, state agencies, and decision-makers in Kalispell, Columbia Falls, Whitefish, Bigfork, Flathead County, Glacier National Park and Flathead National Forest to put together an integrated, countywide solid waste management system for all biodegradable waste. The proposed Glacier Gold Composting Plant has been met with great acceptance. Cooperation from public officials has been excellent at every level of government and is expected to continue. This is an example of private enterprise with its flexibility, trying to solve a public problem.

The composting facility can be characterized as a total containment design with materials held in concrete basins or pads. The processing will be performed in buildings, unlike the EKO-KOMPOST operation which is an outdoor facility.

The final product of the composting operation can be used as fertilizer/soil conditioner for agriculture, landscaping and mine reclamation. It is anticipated that the composted product will first be sold in bulk, then in bags as the market develops.

The project is currently in the planning and permit stage. American Timber Company would like to put the facility into operation later this year. American Timber Company is genuinely committed to providing an environmentally suitable service to the Flathead community.

PRE-REGISTRATION FORM

1993 ANNUAL MSAWWA/MWPCA CONVENTION
April 21, 22, and 23, 1993
Butte, Montana

Pre-Registration information must be received by March 25, 1993!!! Make check payable to the MSAWWA/MWPCA Host City Committee and mail it along with the following information to:

MSAWWA/MWPCA Host City Committee
800 Centennial Avenue
Butte, Montana 59701

Name ____
(Last) (First) (Middle Initial)
Title ____
Organization ____
Mailing Address _____________________________________
City, State, Zip ____________________________________
Spouse/Guest Name (if attending) ____________________

* * *

REGISTRATION FEES

Pre-conference Seminar	$40.00	________
AWWA and/or MWPCA Members	$85.00	________
AWWA and/or MWPCA Members (one day only)	$60.00	________
Non-Members*	$95.00	________
Non-Members (one day only)	$70.00	________
Spouse/Guest (all meals included)	$28.00	________
Additional Luncheon Tickets: Thurs._____ Fri._____	$ 8.00	________
Additional Thursday Banquet Tickets	$18.00	________
TOTAL REMITTANCE	$	________

*Non-members joining now enclose completed membership application and one year's dues; then register as a member.

PRECONFERENCE SEMINAR

April 21, 1993

"Innovative Solutions"

Discussion and Field Tour

8:00 a.m.	Registration at Copper King
9:00	Meeting at Copper King Conference Room Coffee and Seminar Overview
10:00	Directed Tour of the Berkeley Pit
11:00	Directed Tour of Mining Operation/Resource Recovery
11:45	Lunch at the Copper King Speaker to discuss the Industrial Perspective Towards Butte-Anaconda Environmental Cleanup Activities
1:00 p.m.	Directed Tour of MHD Research Facilities
2:30	Directed Tour of the Montana Pole Groundwater Treatment System
3:45	Brief Inspection of Colorado Tailings

Preconference Seminar cost is $40.00
which includes lunch and transportation

Attendees will earn 0.7 Continuing Education Credits

Annual Joint Meeting

of
The Montana Section of the American Water Works Association
and
The Montana Water Pollution Control Association
April 22 - 23, 1993
Copper King - Butte, Montana

Conference Theme:
Innovations in Thought - The Key to the Future of Water Quality

* * *

Tentative Technical Program

Joint Morning Session
April 22, 1993
8:00 - 11:30 a.m.

Session Theme: **New and Innovative Approaches to System Financing**

8:00 a.m. Call to Order
Introductory Remarks

Discovering the Future - The Business of Paradigms

Financing and Rebuilding the Butte Water System
- Jim Kambich, President, Silver Bow Water, Inc.

Successfully Financing Infrastructure Improvements
- Steve Huntington, Mountain West Management

Treasure State Endowment
- Dave Cole, Montana Dept. of Commerce

System Cost Minimization
- Karen Bucklin Sanchez, MSU Extension Office

11:45 a.m. to 1:00 p.m. Luncheon

Annual Joint Meeting
of
The Montana Section of the American Water Works Association
and
The Montana Water Pollution Control Association
April 22 - 23, 1993
Copper King - Butte, Montana

Conference Theme:
Innovations in Thought - The Key to the Future of Water Quality

* * *

Tentative Technical Program
Concurrent Sessions
April 22, 1993
1:30 - 4:30 p.m.

1:30 p.m. **SESSION A**
Session Theme: Water Quality in Communities and Industry

Biological Growth on Surfaces in Water Distribution Systems: Anne Camper, MSU

Variations of Chlorine Residuals in Water Distribution Systems: William Hunt, HKM & Associates

Storm Water Regulations for Municipalities and Industries: Roxann Lincoln, MDHES/WQB

Billings Experience with the Lead and Copper Rule: Joe Steiner, City of Billings

1:30 p.m. **SESSION B**
Session Theme: A New Look at "Old" Water Quality Issues

Nutrient Removal at POTWS: Dennis Carver (tentative)

The Montana Constitution and Its Implications in Regard to Environmental Protection: Mona Jamison (tentative)

Recent Development in the Implementation of the Water Quality Act's Nondegradation Policy: Kevin Keenan, MDHES/WQB

Trenchless Reconstruction Using Annulus Free PE & PRC: Greg Howells, Gelco Service

Annual Joint Meeting
of
The Montana Section of the American Water Works Association
and
The Montana Water Pollution Control Association
April 22 - 23, 1993
Copper King - Butte, Montana

Conference Theme:
Innovations in Thought - The Key to the Future of Water Quality

Tentative Technical Program
Concurrent Sessions Continue
April 23, 1993
8:00 - 11:30 a.m.

8:00 a.m. **SESSION A**
Session Theme: Holistic Approaches to Water Quality

Stream Management: Scott Gillilan, Interfluve, Inc.

Protecting the Environmental Infrastructure - An Ecological Approach to Water Pollution Control: Loren Bahls, MDHES/WQB

Idaho Pole Superfund Site - Options for Aquifer Remediation: Jay Cornish, MSE, and Bill Bullock, Pioneer Technical Services

Watershed Management: Gary Ingman, MDHES/WQB

8:00 a.m. **SESSION B**
Session Theme: Operations and Management - A Key Element in Water Quality

Buried, but Alive - Visibility for Unseen Infrastructure: Dan Kandilas, City of Great Falls

Regionalized Management Structures: Bill Leonard, MAP (tentative)

Waivers and Vulnerability Assessments - Reducing Monitoring while Protecting Public Health: Vern Heisler, MDHES/WQB, Billings

Bag and Cartridge Filtration Technologies: Nancy Elstad, 3M Filtration Products

State Approval of Alternative Filtration Technologies: Donna Jensen, MDHES/WQB

pH Measuring, Troubleshooting, and Use: Jim Osmun, Orion Research

12:00 noon **Joint Business Luncheon**

BUYERS BEWARE!!!

by Donna Jensen, WQB

In recent months there have been reports of aggressive treatment equipment distributors out there that may be trying to convince water suppliers to buy equipment that isn't necessary. Although you're undoubtedly approached often by sales people, and many are reputable assets, these recent reports prompted us to warn you again of the potential problems.

We're especially concerned about systems using shallow wells, springs and infiltration galleries being told they've got to filter their sources. The Public Water Supply Program is charged with making the decision as to whether a shallow source should be filtered or fall under other parts of the Surface Water Treatment Rule. Rest assured we'll be in contact with you directly if or when your system is being evaluated by us for direct surface water influence. If you haven't heard you're surface water from us any such claims should be ignored and reported to one of our offices listed below.

We've also been advised by filtration plants that they're being approached about installing post filtration filtration (a means of "polishing" your plant's effluent. If you are approached and want to talk it over with us, please don't hesitate to call. One such sales approach was very anti-operator. If you receive one of those we'd especially like to hear about it.

We're not claiming that the promoted equipment is bad, it will likely have appropriate uses in some Montana public water supplies. What we want to do is to let you know there have been some problems reported to us so if something doesn't sound quite right to you or you want more information, please don't hesitate to call. Our phone numbers are 444-4549 in Helena, or 657-2616 in Billings.

NEWS from the Montana Water Pollution Control Association

by Barry Damschen

In September, 1992, the Water Environment Federation's (WEF) Annual International Conference and Exposition was held in New Orleans. This was the first annual conference under the Federation's new name. As many of you know, the Federation changed it's name in 1992 from the Water Pollution Control Federation to the Water Environment Federation. We also anticipate changing our Montana chapter's name this spring to the Montana Water Environment Association.

As our Association's new incoming National Director for the next three years, I foresee exciting things happening. One primary item that I noticed while attending the conference in New Orleans was the large attendance of individuals from other countries. Conversations with these international members opened my eyes to the far-reaching goals and accomplishments that the Federation is achieving on a worldwide basis. Secondly, I noticed that a primary goal for the future is to greatly expand into the hazardous and solid waste fields to augment the more traditional wastewater field which has been the main priority of the Federation in the past.

As Director, I encourage each individual in Montana who is involved in the wastewater, hazardous waste and solid waste fields to become an active member in our Association. The rewards of the time spent are not only quite useful technically and professionally, but the acquaintances that are made through the interaction with other members, in many cases, develop into long-term friendships. I look forward to seeing everyone in the waste treatment and disposal fields at our annual conference in Butte on April 21-23, 1993.

Finally, I would like to give Kristi Kline, of Havre, a special recognition of thanks for her long-term commitment to our Association. As our outgoing National Director, Past President, and chairperson of several committees over the past ten years, Kristi has served our Association extremely well and has contributed many long hours on her own time. We thank Kristi and look forward to her continued interest and contribution to our Association.

Membership Application 1992

1 Send Completed Application and Payment to:
WEF, Financial Management
601 Wythe Street • Alexandria, VA 22314-1994, USA
For more information, call 1-800-666-0206 or FAX 703-684-2492

Association Choice: (Please print or type)
Select one from the list on back of this form.

Use this application to join the Water Environment Federation and your local Member Association. Simply complete this application and return it to the address above. Along with your monthly publications, you are also entitled to group insurance, technical assistance, discounts on technical publications, and much more!

2
(11) First Name, Middle Initial
(16) Last Name
(3) (Jr., Sr., etc.)

Mailing address: ☐ Business or ☐ Home

(30) Business Name (if applicable)
(30) Street or P.O. Box
(18) City
(2) State
(9) Zip Code
(12) Country
(10) Telephone — Home
(10) Business
(10) FAX (If applicable)

---

3 Please refer to facing page when completing this section.

Employer Code (2) Other (please specify)
Job Title Code (4) Other (please specify)
Education Code (2) **Fields of Interest** (2) (2) (2) (2) (2) (2) Other (please specify)

---

4 **WEF Sponsor** (Optional) (20)
Sponsor's Member I.D. Number (7)

Source Code (2)
(For WEF Use Only)

---

5 **Membership Categories: Choose one membership category and fill in the appropriate dues. Use the chart on the reverse side.**
*Note: Retired? Call the WEF Member Services Center at 1-800-666-0206 to find out about our new retired membership category.

☐ **Active**
For individuals involved or interested in the advancement of knowledge pertaining to water quality.
Dues $______
Dual* $______
Select ONE Included
☐ WE&T
☐ Water Environment Research
Highlights Included
Add-On Options (See below)
Periodical Code *Cost*
______ $______
TOTAL $______

☐ **Operations Division**
For individuals working on a day-to-day basis in (or retired from) a wastewater collection, treatment, or laboratory facility.
Dues $______
Dual* $______
Forum Included
Highlights Included
Add-On Options (See below)
Periodical Code *Cost*
______ $______
TOTAL $______

☐ **Student**
For individuals enrolled at least half-time in a college or university.
Dues $______
Dual* $______
Select ONE Included
☐ WE&T
☐ Water Environment Research
☐ Forum
Highlights Included
Add-On Options (See below)
Periodical Code *Cost*
______ $______
TOTAL $______

☐ **Corporate/Contractor**
Corporations engaged in the design, construction, operation or management of water quality systems. Contractors who are individuals or firms commercially engaged in general or specialty contracting.
Dues $______
Dual* $______
WE&T Included
Water Environment Research Included
Forum Included
Highlights Included
Washington Bulletin Included
Add-On Options (See below)
Periodical Code *Cost*
______ $______
TOTAL $______

---

6 * Dual Membership is designed for members who wish to belong to more than one Member Association. You must be a WEF member to be a dual member.

(Indicate dual association here.)

Add-On Options		Periodical Code	Cost
One or more of the following	Water Environment & Technology	WET	$30.00
WEF periodicals may be	Water Environment Research	RJ	30.00
ADDED to your membership	Operations Forum	OF	20.00
package if they are not already	Bench Sheet	BS	29.00
included. Please enter the	Washington Bulletin	WB	29.00
Periodical Code and *Cost* in the	The Job Bank	JB	36.00
allocated spaces above.	Safety & Health Bulletin	SB	10.00

7 **Method of Payment**
☐ **Check Enclosed:**
Make Check Payable to WEF
☐ **Charge my:** ☐ VISA ☐ MC ☐ AMEX

Account Number — Expiration Date

Signature — Daytime Phone No.

Postal Requirement: Dues allocated for publications when included in membership: WE&T—$30; Water Environment Research—$30; Highlights—$15.00; Operations Forum—$20.00; Washington Bulletin—$29.00.

OFFICIAL NOTICE

TO MWPCA MEMBERS

NAME CHANGE

The Montana Water Pollution Control Association will vote on a name change this April at the business meeting at the annual conference to be held in Butte.

As proposed by the MWPCA Executive Committee, the proposed amendment to the Association Constitution and Bylaws will change the name from the "Montana Water Pollution Control Association" to "Montana Water Environment Association." **If approved by the majority of votes cast, the text of the Constitution and Bylaws of the MWPCA will be changed such that all names "Montana Water Pollution Control Association" will be changed to "Montana Water Environment Association."** The change proposed is consistent with the change made by the Water Environment Federation (formerly Water Pollution Control Federation). The Federation selected the new name after an extensive selection process and believes the new name better reflects the goals and objectives of the organization.

All members are encouraged to attend the business meeting at the conference to discuss and vote on this change. The Committee will retain the existing name if inadequate votes are received in support of the new name. If you cannot attend, you may vote in Absentee by sending your vote, in writing, either for or against the new name, to:

Dick Pedersen, Executive Secretary
609 S. Sanders
Helena, MT 59601

MWPCA LOGO CONTEST

Design a LOGO for our association and win $50.00!! Many other state associations have unique designs that feature aspects of their state or region and/or cultural heritage. The MWPCA Executive Committee is offering this logo contest to its membership. The current logo for our state association of the Water Environment Federation (see inside front cover) has been the same since the beginning of this group. In the past few years, WEF has changed its logo to a modern graphic style which symbolizes a **cascade**. We could adopt it or design our own. Let's see what you folks come up with. My bet is . . . we'll be amazed. **Send entries to:**

Bill Bahr
DHES - WQB
1400 Broadway
P. O. Box 200901
Helena, MT 59620-0901

* * *

AREN'T YOU GLAD WE DO THINGS DIFFERENTLY THESE DAYS

100 Years Ago:

Without warning the earth trembled and fell. Silently the adobe wall tore loose from the surrounding earth and tumbled into the ditch. Against the wall it squeezed Joe Saoyear and Valentine Nowock. The former unfortunate it bruised and crushed from his breath the life. The accident occurred near the corner of Second Avenue South and Eighteenth Street where an extension of the water main is taking place.

Some forty or fifty men were working quietly on the trench which at the place where the accident occurred had reached a depth of about six and one-half feet. The earth in which they were working was the treacherous adobe. It gave no signs whatever of danger. Josef Saoyear and two other Austrians were working close together. There came a sudden shiver and the earth fell. A single shriek sounded. ...The work of rescue at once began.

Just nine months ago the dead man came across from Austria. It is stated that he left there a wife and four children.

(Reprinted from the Great Falls Tribune)

Montana Section
American Water Works
Association

Montana Section
American Water Works
Association

Membership Drive!
Help Sign Up More Awwa Members!

This is your chance to win one of the following three prizes at the 1993 MSAWWA/MWPCA Conference:

First Prize:	20" RCA Color TV with Remote
Second Prize:	Sony CD Radio/Cassette Recorder
Third Prize:	HP32S11 Scientific Calculator

We can't give away these prizes unless you sign up new members . . . . . so please, please help us!

Here is how you WIN:

For each member who you recruit from now until the conference, your name will be written on a chance for the drawing. Therefore, the more people you recruit, the more chances you will have in the hat for a prize.

Recruiting Ideas:

Persons from every area of the water industry (vendors, utilities, consultants, contractors, government agencies, etc.) are great candidates for membership. Explain how membership in AWWA helps one keep abreast of the latest water-treatment technologies.

AWWA members can also purchase useful manuals and handbooks and attend technical seminars at reduced rates.

Keep in mind that students may join AWWA at a lower rate, and should be encouraged to do so. AWWA publications can be useful in their coursework, and participation in our Montana Chapter assists in developing professional contacts.

PLEASE HELP SUPPORT OUR MSAWWA MEMBERSHIP DRIVE AND THE TELEVISION, CD/RADIO/CASSETTE PLAYER, OR CALCULATOR MAY BE YOURS!!

AMERICAN WATER WORKS ASSOCIATION

INDIVIDUAL MEMBERSHIP APPLICATION

AWWA USE ONLY

Complete this form and mail to:
AWWA / 6666 W. Quincy Avenue / Denver, CO 80235
(303) 794-7711 • FAX (303) 794-7310

PLEASE PRINT OR TYPE

Last Name ____________________ First Name (and middle initial) ____________________

Mailing Address ____

____

City ____________________ State/Province ______ ZIP/Postal Code __________

Area Code ______ – Telephone ______ – ______ Area Code ______ – FAX ______ – ______

Title ____

Employer's Name (If not already in mailing address) ____

Applicant's Signature ____________________ Date __________

Signature of AWWA Member Endorsing Application (Optional) ____________________ Endorsing Member Number __________

ANNUAL DUES:

$72/Active
Grade Code 02

$33/Operations (formerly Affiliate)
Grade Code 06
(For operator level personnel or employees of small utilities. Will not receive Journal AWWA.)

$24/Student
Grade Code 14

ANNUAL DUES $ __________

New England Assessment* __________

Multi-Section Option (other than own) __________

TOTAL DUE $ __________

*Applicants with an address in the New England Water Works Association Section of AWWA (ME, NH, RI, VT, MA) must include $32.00 for Active Membership, or $15.00 for Operations Membership with their annual dues.

Make check payable to AWWA (Canadian funds add 15%).

☐ MasterCard ☐ VISA ☐ Diner's Club
☐ American Express ☐ Send Invoice

Card Number ____________________

Expiration Date __________

PREPAYMENT OF ONE YEAR'S DUES REQUIRED
No action can be taken on this application until payment is received.

If you have been a member of AWWA before, indicate dates here:

____

☐ Please send an AWWA membership certificate.

Address shown above is (check one): ☐ Home ☐ Office

MULTI-SECTION MEMBERSHIP

You may also select a year's membership in **other** AWWA sections by circling your choices and including $14 for each section circled. Enter this total on the line reading "multi-section option".

CIRCLE SECTION CHOICES

AKA	ALASKA
ALA	ALABAMA-MISSISSIPPI
ARI	ARIZONA
ATC	ATLANTIC-CANADA (NB, NF, NS, PEI)
BRC	BRITISH COLUMBIA (BC, YT)
CAL	CALIFORNIA-NEVADA
CHS	CHESAPEAKE (DE, DC, MD)
CON	CONNECTICUT
FLA	FLORIDA
GEO	GEORGIA
HWI	HAWAII (GUAM)
ILL	ILLINOIS
IND	INDIANA
INT	INTERMOUNTAIN (UT & PART OF ID)
IWA	IOWA
KAN	KANSAS
KNT	KENTUCKY-TENNESSEE
MEX	MEXICO
MIC	MICHIGAN
MIN	MINNESOTA
MOU	MISSOURI
MTN	MONTANA
NDK	NORTH DAKOTA
NEB	NEBRASKA
*NEW	NEW ENGLAND (ME, NH, RI, VT, MA)
NEJ	NEW JERSEY
NEY	NEW YORK
NOC	NORTH CAROLINA
OHO	OHIO
ONT	ONTARIO
PAC	PACIFIC NORTHWEST (OR, WA & PART OF ID)
PEN	PENNSYLVANIA
PRT	PUERTO RICO
QUE	QUEBEC
RMT	ROCKY MOUNTAIN (CO, NM, WY)
SCR	SOUTH CAROLINA
SDK	SOUTH DAKOTA
SOW	SOUTHWEST (AR, LA, OK)
TEX	TEXAS
VIR	VIRGINIA
WEC	WESTERN CANADA (AB, MB, NT, SK)
WEV	WEST VIRGINIA
WIS	WISCONSIN

*IF "NEW" ENGLAND IS A CHOICE, add $46.00. This includes their assessment and multi-section fee.

ALL APPLICANTS SHOULD COMPLETE THIS SECTION:
Circle the descriptions below that best describe you. The information is used in audits of AWWA readership. Circle only ONE in each group.

BUSINESS AND INDUSTRY
- A. Public Water Supply Utility–Municipally Owned
- B. Public Water Supply Utility–Investor Owned
- C. Governmental—Federal, State, Local
- D. Consultant
- E. Contractor
- F. Private Industrial Systems or Water Wholesaler
- G. Manufacturer of Equipment & Supplies including Representatives
- H. Distributors of Equipment & Supplies including Representatives
- I. Educational Institutions, Faculty and Students, Libraries, and Other Related Organizations
- J. Fully Retired
- K. Research Labs
- L. Unreported

JOB TITLE
- A. Executive-Gen'l Mgr., Commissioner, Board Member, City Mgr., Mayor, President, Vice-President, Owner, Partner, Director, etc.
- B. Management-Division Head, Section Head, Mgr., Chief Engineer, Comptroller, etc.
- C. Engineering/non-managerial-Civil Engr., Mech. Engr. Envir. Engr., Planning Mgr., Field Engr., Systems Designer, etc.
- D. Scientific/non-managerial-Chemist, Biologist, Biophysicist, Researcher, Analyst, etc.
- E. Purchasing-Purchasing Agent, Procurement Specialist, Buyer, etc.
- F. Operations-Foreman, Operator, Maintenance, Crewman, Service Rep., etc.
- G. Marketing & Sales/non-managerial-Mkt. Analyst, Mkt. Rep., Salesman, Sales Rep., etc.
- H. Other (describe) ____________________

CHECK FIELD(S) SERVED:
5 ☐ Water Supply Only
7 ☐ Wastewater Only
9 ☐ Both
3 ☐ Other

In some AWWA sections, a portion of the section allotment equal to 50 percent or more of the domestic subscription rate charged for the section periodical will be allocated toward a subscription of that periodical.

Dues allocated for each publication members receive:
Journal $28
MainStream $6
Opflow $5

1/93

Give drinking water a hand®

Why Do We Need Blue Thumbs?

By Joan Dent

As a nation, we celebrate Earth Day. We save whales. We recycle. We pass regulations to protect owls. We manufacture and buy "green products."

There's an issue that's even closer to home. That's drinking water. Tap water. Public water supply. Families turn on water taps about 70 times a day. We drink water. We offer it to our children. We make coffee, cocoa, and fruit juices with it. We boil our vegetables in it. We make soup out of it. We wash our clothes, our dishes, and our bodies in it.

Actually, we are about 65% water. We depend on it to live, and must drink it to survive.

It's time to act as if we care.

Each year more than 170 million tons of industrial wastes are dumped into U.S. waterways. In addition, many experts estimate that the amount of toxic household products under our own kitchen sinks creates more pollution than industry.

In terms of quantity, 250 million people have access to the same amount of water our ancestors did 200 years ago — when the U.S. population was four million.

It's time to act not only to protect water as a natural resource, it's time to take personal and public actions on drinking water as a public health resource.

We each make at least 30 decisions a day that affect water, for example, turning the tap on and off, choosing to throw bug and weed killers, oven cleaners, and other common toxins in the trash. Each day at home there are many opportunities to make decisions that conserve and protect water.

In addition to the decisions we make in our homes, we also make decisions in our workplaces. For example, recycled paper is good for water two ways, it cuts down the water pollution from papermaking, and uses less water in the manufacturing process. Have you ever seen your workplace sprinkler system running in the rain? One decision you can make is to call maintenance and suggest shutting it off. You can also make a decision to report dripping faucets.

In our cities and towns decisions are also being made that affect water. The siting of industries and parking lots, recycling programs, and conservation ordinances are all local decisions.

We can write letters, call our elected officials, attend meetings, and speak up for water. We need to make sure that drinking water source and quality issues are considered in all community decisions. After all, when we make drinking water decisions, we are making decisions about our health.

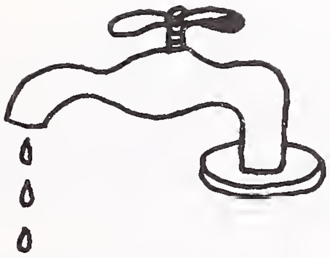
It's time to use our Blue Thumbs to take action to nurture and protect our precious drinking water.

Joan Dent is director of Public Information for the American Water Works Association (AWWA). Blue Thumb: Give Drinking Water a Hand is the theme for National Drinking Water Week, May 2-8, 1993. National Drinking Water Alliance members include AWWA, the US Environmental Protection Agency, the USDA Extension Service, the American Ground Water Trust, the League of Women Voters Education Fund, the Water Education Foundation, the Association of State Drinking Water Administrators, the National Association of Water Companies, the Association of Metropolitan Water Agencies, the American Library Association, and the National Geographic Society.

Printed on Recycled Paper

BLUE THUMB BLOOPERS
Embarrassing moments in the life of a water drinker

Give drinking water a hand.



1. Waiting a week to fix a leak.

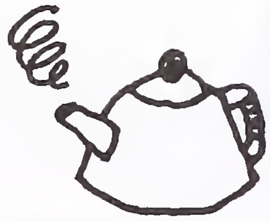
Assume little leaks only waste a little water? You can lose up to 200 gallons of water a day from a leaking toilet. And a faucet can drip 604,800 drops while you're waiting.

2. Slipping used motor oil into a storm sewer or burying it in the trash.

Hey slick, oil can leach into lakes, rivers, and wells. Just one pint can expand over an acre of water. Take your used oil to a recycling center.

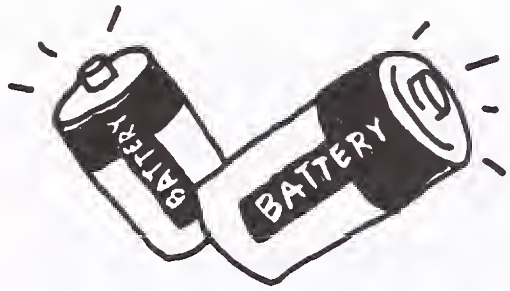
3. Watering your lawn at high noon.

Caught with your sprinkler on? The hot sun will evaporate the water your lawn needs. Better water early in the day.



4. Taking a shortcut and using the hot water tap when cooking.

That's taboo, and it can shortcut your health. Lead can dissolve into hot water from lead pipes and solder. Cold water is better. Heat it on the stove when cooking or making baby formula.



5. Tossing toxics in the trash.

How tacky! Consider batteries, a common throw-away. They contain lead and mercury. Some ordinary household cleaners have other poisons that contaminate water. Here's a tip, drop them off at a special collection site.

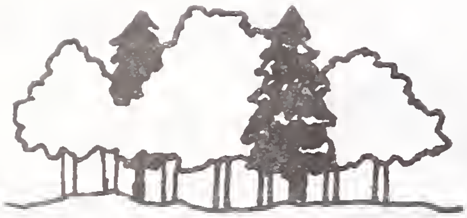
6. Using your garbage disposal all the time.

Want to show good taste after a meal? With your disposal using one gallon of water a minute, compost those food scraps. Another benefit, you'll be creating a great soil conditioner.

BLUE THUMB BLOOPERS

Embarrassing moments in the life of a water drinker

Give drinking water a hand.



7. Failing to check for the recycled mark on paper before buying it.

Still think recycled paper only helps trees? Recycled paper reduces water pollution from paper production by 35 percent. It saves water too — 7,000 gallons for every ton of paper.

8. Using electricity as if it didn't affect water.

It's time to shed some light on this. It takes more than 130 billion gallons of water a day to generate electricity in the U.S. Conserving energy is conserving water.

9. Thinking you can't make a difference.

It's never a blooper to take a stand for clean water, through your actions and through your words. So put your Blue Thumb knowledge to work and give drinking water a hand every day.

To find out more, order the "Blue Thumb Basics" brochure listing more than 50 additional ways to conserve and protect your drinking water. Send a self-addressed, stamped envelope to "Blue Thumb Basics," Public Information Department, American Water Works Association, 6666 W. Quincy Ave., Denver, CO 80235.

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THE BLUE THUMB QUIZ

BLUE THUMB

Give drinking water a hand.

Here are 20 quick questions to find out if you know how to give drinking water a hand.

Mark the following true or false and compare your answers with those on the back of this sheet.

TRUE FALSE

☐ T ☐ F 1. Installing a low-flow toilet can save a family of four more than 45 gallons of water a day.

☐ T ☐ F 2. More than 75 percent of the water in the United States is located underground.

☐ T ☐ F 3. Reading the labels on common household products won't tell you what products are harmful to water.

☐ T ☐ F 4. Americans improperly dispose of more oil in a year than the Exxon Valdez spilled.

☐ T ☐ F 5. Even when a recipe calls for using warm or hot water, you should draw cold water from the tap and heat it on the stove or in the microwave.

☐ T ☐ F 6. It's safe to drink water directly from remote streams.

☐ T ☐ F 7. There are ways to landscape that use between 30 - 80 percent less water than traditional landscaping.

☐ T ☐ F 8. If you have your own well, you can be sure your water is safe.

☐ T ☐ F 9. You can drink more than 4,000 eight-ounce glasses of tap water for the same cost as a six-pack of soda pop.

☐ T ☐ F 10. Common outdoor bug and weed killers can contaminate underground water or end up in your local river or lake.

☐ T ☐ F 11. The quality of U.S. drinking water is not regulated by the federal government for safety.

☐ T ☐ F 12. Two-thirds of the water you use at home you use in the bathroom.

☐ T ☐ F 13. Trash and debris around a lake won't affect water quality.

☐ T ☐ F 14. It's better for water if you dry out leftover household products such as furniture polish, car wax, or latex paint, before disposing of them.

☐ T ☐ F 15. More than 800,000 new water wells are drilled each year for domestic, commercial, and industrial use.

☐ T ☐ F 16. Letting the water run while you brush your teeth or shave is water wise.

☐ T ☐ F 17. New water sources are being discovered every day.

☐ T ☐ F 18. An abandoned well can be left unsealed without jeopardizing the groundwater source.

☐ T ☐ F 19. You can ignore a leaky faucet at work or at school... it's only worth saving water at home.

☐ T ☐ F 20. You can influence decisions your community makes on drinking water.

Get involved

PROTECT

conserve

BLUE THUMB QUIZ ANSWERS

1. True. That's 1,350 gallons a month!

2. True. However, 50 percent of U.S. drinking water is from surface sources.

3. False. Don't buy products that say "poisonous, toxic, corrosive," etc.

4. True.

5. True. Heat can dissolve lead from pipes and solder into your water. New houses with lead-free solder are not as likely to have lead problems.

6. False. Giardiasis can be caused by animal wastes in remote untreated streams.

7. True. It's called Xeriscape™.

8. False. Contaminants can seep through the ground — have your well tested for contaminants by your local Health Department.

9. True. In some cities, the number of glasses can go as high as 15,000.

10. True. They can seep into the water under ground or rain can wash them into surface water.

11. False. The U.S. government regulates quality and currently has standards for more than 80 contaminants.

12. True. Showers and toilets are the major users.

13. False.

14. True. Even though some landfills have a protective lining, leakage can occur and contaminate groundwater.

15. True. Many are drilled to monitor water quality in aquifers and in areas around dump sites.

16. False. It wastes water.

17. False. We have identified or are using most water sources in the U.S.

18. False. All unused wells should be capped. Open wells can provide a route for contaminants to reach aquifers.

19. False. It's smart to save water no matter where you are.

20. True. Call your water utility company, speak up at public meetings, write a letter to your City Council — you can affect decisions!

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NITRATE CONTAMINATES MONTANA'S DRINKING WATER MORE OFTEN THAN ANY OTHER CHEMICAL SUBSTANCE

by Carole Mackin, WQB

In Montana, nitrate contaminates our drinking water more often than any other chemical substance. Nitrate is an essential nutrient for plant growth. So, it is a major ingredient in fertilizers. If you put a fertilizer on a crop, garden, or lawn and then apply too much water, the nitrate can be carried right past the root zone where the plants can pick it up and end up in the groundwater. Nitrate also can get into the water directly from decomposing plants, especially alfalfa which makes nitrate in its root nodules.

Nitrate also gets into the water from many other sources. It is in some rocks. For example, shales that were laid down by shallow seas millions of years ago can contain nitrate. This is one reason why well drillers avoid installing a well in a shale aquifer.

Perhaps the most important source of the nitrate that threatens drinking water is household sewage, especially human waste that gets flushed down the toilet. We have chosen to use water to move human waste to a place where it can be treated --- a sanitary wastewater plant or a septic system.[1/] In doing this, clean water is contaminated with bacteria as well as nitrate. It costs each of us a lot of money to clean up this water so others, downstream or downgradient, can drink it. **Yes, we all drink water that once flushed human waste down a toilet.**

But what's so bad about nitrates? Isn't it added to all our processed meats to keep them fresh longer? The answer is that low levels of nitrates are not harmful to adults; but for infants, nitrate can be deadly.

Nitrate above 10 parts per million (ppm) in our drinking water can cause "Blue Baby Syndrome." Let me help you picture how much nitrate is in 10 ppm. If you have a million water molecules with 10 nitrates mixed in, you have 10 ppm. Let me give you another example. Salt Lake City has about one million people. If only 10 Montanans go there to visit, then Salt Lake City has 10 ppm of Montana visitors.

Blue Baby Syndrome has a medical name --- methemoglobinemia. Infants, up to six months of age, change the nitrates to nitrites in their body. The nitrites do not allow the blood to carry oxygen. Blood that is not carrying oxygen is blue in color --- the color of blood in everyone's veins. The first symptom to appear in an infant drinking water contaminated with nitrate is a bluish color to the skin. That's why it is called Blue Baby Syndrome.

Many people believe that boiling their drinking water for five minutes will assure their water is safe to drink. **But, boiling the water will not destroy nitrate.** In fact, boiling the water can cause a nitrate problem to become worse, because water is evaporated. People who are told that their water is contaminated with nitrates should not allow infants to drink the water.

If you would like to test your water for nitrate levels, the test is easy and inexpensive. The test costs less than $10. You can get a plastic bottle to send in your water sample from any water testing laboratory in your area. Check the *Yellow Pages* under **Laboratories, Analytical** for the lab nearest you, or contact the Montana Water Quality Laboratory, Cogswell Building, Helena, Montana 59620, or telephone (406) 444-3444.

[1/] For information on alternative ways of handling human waste, see *We All Live Downstream, a Guide to Waste Treatment That Stops Water Pollution,* by Pat Costner, Waterworks Publishing Company, Eureka Springs, Arkansas.

INFORMATION

. . . from the Wellhead Protection Program

by Carole Mackin, WQB

MONTANA CITIES TAKE THE LION SHARE OF EPA WELLHEAD PROTECTION GRANTS

Region VIII of the EPA announced $100,000 in Wellhead Protection Grants for 1992. Three Montana cities qualified for a total of $76,730. The cities are:

East Helena	*$ 26,730*
Choteau	*$ 25,000*
Livingston	*$ 25,000*

Laramie, Wyoming was awarded the remainder of $23,270.

The competition was fierce. Proposals came from cities in seven states --- Colorado, Utah, South Dakota, North Dakota, Idaho, Wyoming, and Montana. Montana also sent in three excellent proposals from Huntley, Twin Bridges, and Bozeman which were not funded. But, there's always next year.

East Helena Wellhead Protection

The Lewis and Clark Water Quality Protection District and the City of East Helena received $26,730 to establish a wellhead protection area for the city's three wells and two infiltration galleries. This project is unique for two reasons: 1) it will demonstrate the role a local water quality district will play in designing a wellhead protection area; and, 2) it will demonstrate the special considerations for delineating a protection area for an infiltration gallery.

After the East Helena project is complete, the Lewis and Clark Water Quality Protection District will use the lessons learned to provide wellhead protection areas for all the public water supplies in the Helena valley. There are about 60 small public water supplies. They range from trailer courts and subdivisions to schools and restaurants.

Choteau Wellhead Protection

Choteau, a small community nestled along the Rocky Mountain front, is also concerned about protecting the quality of its drinking water. Choteau gets its water from two springs and two shallow wells in an alluvial aquifer.

The economic base for this community is farming and ranching. The wellhead protection project will explore how agricultural practices may affect water quality. The community hopes to manage its wellhead protection area by establishing "best management practices" to assure that agricultural chemicals and wastes do not enter the water supply.

Choteau is typical of most of Montana's public water supplies. This wellhead protection project will be a useful guide for other small communities in agricultural areas that rely on alluvial aquifers.

Livingston Wellhead Protection

Livingston is no stranger to water quality problems. One of the largest groundwater cleanup projects in the state was caused by the Burlington Northern rail yard in town. Three private wells were contaminated with solvents and two city wells were threatened. The city closed down the threatened wells and drilled new wells south of town.

The city knows the cost of cleaning up contaminated water and has opted to protect its new water supply. Livingston will also use the project to help reduce future monitoring costs associated with new EPA regulations.

The project will determine the vulnerability of the city's aquifer to contamination, what contaminants threaten the water supply, and what substances have never been used in the area. Armed with this information, Livingston will be ready to apply for waivers to the monitoring requirements that do not apply to the conditions found in its aquifer.

SAMPLING TECHNIQUES

by Bill Bahr, WQB

Setting up a **Comprehensive Sample Collection Program** is an important step in operating a water or wastewater treatment plant. In a wastewater plant, laboratory analyses and interpretation for process control and permit reporting requirements are completely dependent upon **proper and timely** sampling.

SAMPLE TYPES

The sampling program, based on the plant processes, will indicate the type of sample to collect. The two basic sample types are:

- GRAB SAMPLES: all the test material is collected at the same time.
- COMPOSITE SAMPLES: a number of grab samples collected over a period of time and combined.

A grab sample reflects the conditions that exist at a particular time. Use grab samples for tests that must be performed as soon as the sample is collected. Some of these are: pH, chlorine residual, dissolved oxygen, temperature, and fecal coliform. Other situations where a grab sample is desired are: consistent waste stream that does not need a composite sample; an unusual discharge to the plant; an intermittent waste stream (e.g., industrial waste); and, the plant discharge for permit monitoring.

A composite sample represents average conditions over a period of time (usually 24 hours). Situations where composite samples are used are: water/wastewater/sludge conditions for process control; discharge permit requiring a composite sample; and to calculate plant efficiencies. Composite samples may be fixed volume or flow-proportioned; flow-proportional samples have a variety of forms.

Fixed volume composite samples (or simple composite) specify both the time interval and the size of the sample, which remain constant.

Flow-proportioned samples collect volumes of sample which are a proportion of the flow volume. There are two types:

►► Sample volume remains the same and the time interval changes. Increases as flow decreases, and decreases as the flow increases. That is, more samples during higher flow, and fewer samples during lower flow.

►► Time interval stays constant and sample size varies. Larger sample during high flows and smaller sample during low flows.

Either method will yield a sample that is a desired proportion of the plant flow volume and can be collected manually or automatically. Automatic samplers usually collect a set sample and vary the intervals through a flow-sensing device. Manual flow-proportioned samples are used effectively when the flow is not known or is intermittent, as in industrial waste discharges. Here, fixed volume samples can be collected along with flow information and composited later.

REPRESENTATIVE SAMPLES

In order for the sampling program to be accurate, samples collected must be representative of plant flows, processes, and sludges. Follow these procedures to improve sampling technique:

►►► Sample streams consistently in the same location.

►►► Clearly identify separate sample bottles for each location.

►►► Rinse sampling device, scoop, bottle, etc. thoroughly.

►►► Take samples where there is good mixing action.

►►► Observe special precautions for certain tests. For example, volume and preservation or time period before analysis.

By observing these conventions, a representative sample that truly reflects plant conditions at that instant or for a time period can be collected, analyzed, and used to operate the plant and keep it in compliance with Montana's Water Quality Plan.

NEW WQB EMPLOYEE

In September 1992, Bill Bahr came to work for the Water Quality Bureau as an Environmental Specialist in the Municipal Wastewater Assistance Section. Bill came to the WQB after working 12 years as an operator and trainer at the Great Falls wastewater plant. Bill has been active in providing safety training around the state and is also a steering committee member for the Montana Environmental Training Center. While Bill's academic background is in chemistry, he is also certified to teach and is most enthusiastic about training adults. Bill's new job will have him providing technical assistance to wastewater operators, evaluating wastewater plants, holding workshops and answering questions. Bill's education and experience should make him a real asset for the bureau. Bill can be reached at 444-5337 for questions.

* * *

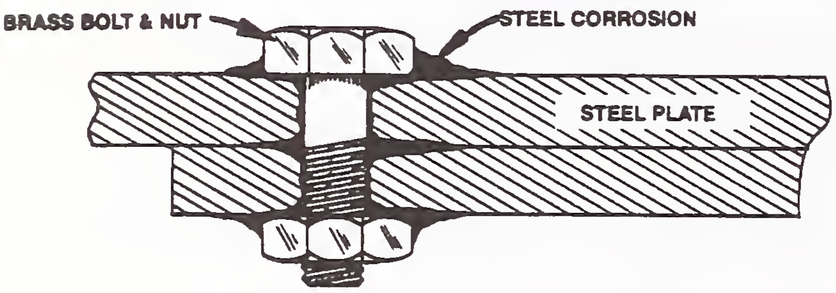
CORROSION---THE UNSEEN KILLER!

by Scott Anderson, WQB

All across the country today, thousands, if not millions, of pounds of steel and other metals will be lost from water and wastewater systems to corrosion. These structures will become useless long before their normal design life if corrosion is not controlled. The rusting and pitting of corrosion occurs at stress points, welds, joints, and particularly in areas where a protective coating has been lost. Corrosion is the loss of metal particles (or ions) from a material caused by the presence of small electrical currents in the right environment. For corrosion to occur, there must be an anode, a cathode, and an electrolyte with available oxygen. An electrolyte must be capable of conducting electricity and, in the case of metallic corrosion, typically will be water or moist soil. Soils can vary considerably in their ability to conduct electricity and corrosion control experts often test soil conductivity by measuring resistance to electrical flow. Corrosion is affected by environmental conditions and can generally be classified as either galvanic corrosion or electro-chemical corrosion.

Galvanic Corrosion

Galvanic corrosion occurs when two different metals are connected in the presence of an electrolyte. Current flows from the metal of higher electrical potential (the anode) to a metal of lower electrical potential (which becomes the cathode). The anode loses the metallic particles whereas the cathode is relatively unaffected. The galvanic series or scale shows the relationship of different metals in terms of potential. Magnesium and aluminum have high potential and gold is shown as having the least potential on the galvanic series. The drawing below is an example of galvanic corrosion showing the migration of steel (primarily iron) ions toward the brass bolt which has a lower potential and acts as the cathode. Had the bolt been made of aluminum, the bolt would corrode and the aluminum ions would travel toward the steel plate.



Electro-chemical Corrosion

Whenever an electric potential difference is present, corrosion can occur. Steel, in the presence of an electrolyte, can establish a potential difference between the material itself and it's surface which results in a migration of ions forming rust. The cycle is self-sustaining and will continue until the steel is consumed. Stray electrical currents, facilitated by soils which conduct currents readily, can have the same effect on steel. The electrical potential differences associated with a specific site can be measured to determine how corrosive the site might be and what remedial measures are needed.

Control of Corrosion

There are a number of methods available to engineers and operators to minimize the effects of corrosion. Protective coatings are probably the most widely used method of protecting metal by preventing the material from contacting the electrolyte and oxygen. A high quality protective coating should be provided during the manufacture or assembly of the metal component and any damage incurred during the installation of the system should be repaired prior to installation. Operators should continue to clean and paint all metal components of their facilities as needed, noting the degree of corrosion that may be present.

Many systems are protected with cathodic protection systems. A sacrificial anode, often magnesium, will be wired to the metal structure and buried in the ground below the water table where possible. The anode will have higher potential than the structure being protected and will "sacrifice" metallic ions in lieu of the metal being spared. These anodes will corrode to nothing over time and will require replacement to maintain protection. While they are typically designed to last many years, specific site conditions could accelerate anode decay. Some designers include an ammeter connected to the anode. The measure of current tells operators when the anode has been consumed.

More elaborate systems using an external direct current source are used to protect metals by reversing the flow of current and making the structure to be protected a cathode rather than an anode donating metal ions. These "impressed current" systems are quite complex and experts in corrosion control should be consulted.

AWWA's
SMALL SYSTEM OPERATIONAL SUPPORT
1-800-366-0107

WHY AN AWWA SMALL SYSTEM 1-800#?

On October 1, 1992 AWWA launched a new service for small water systems serving 1000 connections or less. This service, a toll free 800 number, extends and compliments other information resources aimed at increasing small system viability and compliance records. AWWA's expanded involvement with small water systems brings a century of water utility experience to small system operators. With this long term experience, AWWA is the logical choice to take the initiative to fill any gaps in the delivery of relevant information to small water systems.

HOW DOES "SMALL WATER SYSTEM OPERATIONAL SUPPORT" WORK?

The no cost phone line is personally attended by the small system staff between the hours of 8:00 a.m. and 4:00 p.m. (MST) Monday through Friday. The three member staff has over 50 years combined experience in the operation and management of small water systems.

A great deal of information is available free of charge. There will be a charge when the caller requests publications of special reports; however the caller will be informed of all costs before materials are sent.

The service guides the caller to a solution, and if needed the caller will be referred to local resources for assistance. In addition to state by state resource information, the operational support number can also refer callers to other AWWA staffers specializing in all areas of water supply; water quality, regulations, operations, management and safety. for a detailed literature search AWWA's Waternet can be activated. After hours and when the line is busy callers can leave their name, phone number, and message on voice mail. Voice mail is always in operation and all calls will be returned as soon as possible.

The goal is to answer every call promptly and send out pertinent materials as necessary. An evaluation card is sent to every caller for feedback on the effectiveness of the present program, and suggestions in regard to additional program needs.

Demonstration Project in the Clarks Fork Yellowstone River Valley to Serve as a Model for Other Montana Valleys

by Carolyn V. DeMartino, WQB

The Montana Department of Health and Environmental Sciences-Water Quality Bureau (DHES-WQB) has received funding to conduct the **"Nonpoint and Point Source Demonstration Project of Wellhead Protection for Alluvial Aquifers Within the Clarks Fork Yellowstone Valley of South Central Montana."** The Clarks Fork Yellowstone River Valley, located in Carbon County, is representative of agricultural valleys along rivers in Montana where irrigation is used. A project such as the Clarks Fork Yellowstone Valley Project can serve as a model for groundwater protection within other valleys. The project will focus on the communities of Edgar, Fromberg, Bridger, and Belfry. The project goal is to protect groundwater, used as drinking water, from contaminants that may cause adverse health affects. The DHES-WQB hopes to accomplish this goal by combining wellhead protection plans and best management practices for nonpoint and point sources of potential pollution. The Montana Department of Agriculture will be an advisor for the project.

A shallow alluvial aquifer, approximately three miles wide, extends the length of the Clarks Fork Yellowstone Valley. This aquifer, composed of coarse sand and gravel and fine silt, is extremely vulnerable to potential contamination from both nonpoint and point sources of pollution. The aquifer provides drinking water to 80% of the public water supplies and nearly all rural domestic water supplies in the valley. In 1986 and 1987, trace levels of pesticides were detected in groundwater within the valley. The project will be conducted in the following stages: 1) assess the interest of area residents in wellhead protection and use of best management practices for nonpoint and point source contaminants; 2) describe the hydrology of the valley and delineate wellhead protection areas; 3) inventory potential nonpoint and point sources of pollution within the wellhead delineation areas; and, 4) develop and implement best management plans for nonpoint and point sources of pollution.

On December 15, 1992, WQB personnel conducted a public meeting in Bridger to discuss the project with area residents. Residents from Fromberg, Bridger, Belfry, Joliet, and Red Lodge expressed a tremendous amount of interest in groundwater pollution prevention and in the project. These individuals hope to protect groundwater and want to learn more about the effects of agricultural chemicals on groundwater. A future public meeting will be held to discuss the roles and duties of the state and local governments as they pertain to the protection of groundwater quality within the Clarks Fork Yellowstone Valley. Participation of valley residents will be essential throughout this project.

FEDERAL LAW REDUCES SAMPLING COST AND COMPLEXITY

by Gary Wiens, WQB

Many small water system operators have been very concerned about the cost and complexity of the new Phase II and Phase V rules that took effect in January 1993. Early estimates suggested that this testing of organic and inorganic chemicals could cost thousands of dollars annually for each water source. Fortunately, laboratory costs are not as expensive as once predicted, and costs will be further lowered by the Department of Health and Environmental Sciences (DHES) in deferring the testing of some chemicals, such as endothall, diquat, glyphosphate and dioxin.

In addition, Congress passed a new law in September 1992 that REDUCES ORGANIC SAMPLING REQUIREMENTS FOR SMALL SYSTEMS. The Chaffee-Lautenberg amendment allows the State to require just one sample for the organic contaminants during the initial three-year monitoring period for those systems that:

(a) sample between September 1992 and October 1, 1993,

(b) serve less than 3,300 people, and

(c) show no detection of the organic chemical in that sample and all previous samples.

This alternative will be the least costly approach for nearly all water systems. If you are not clear on how your water system might take advantage of this provision, please contact the Water Quality Bureau at **444-4549**, or write to:

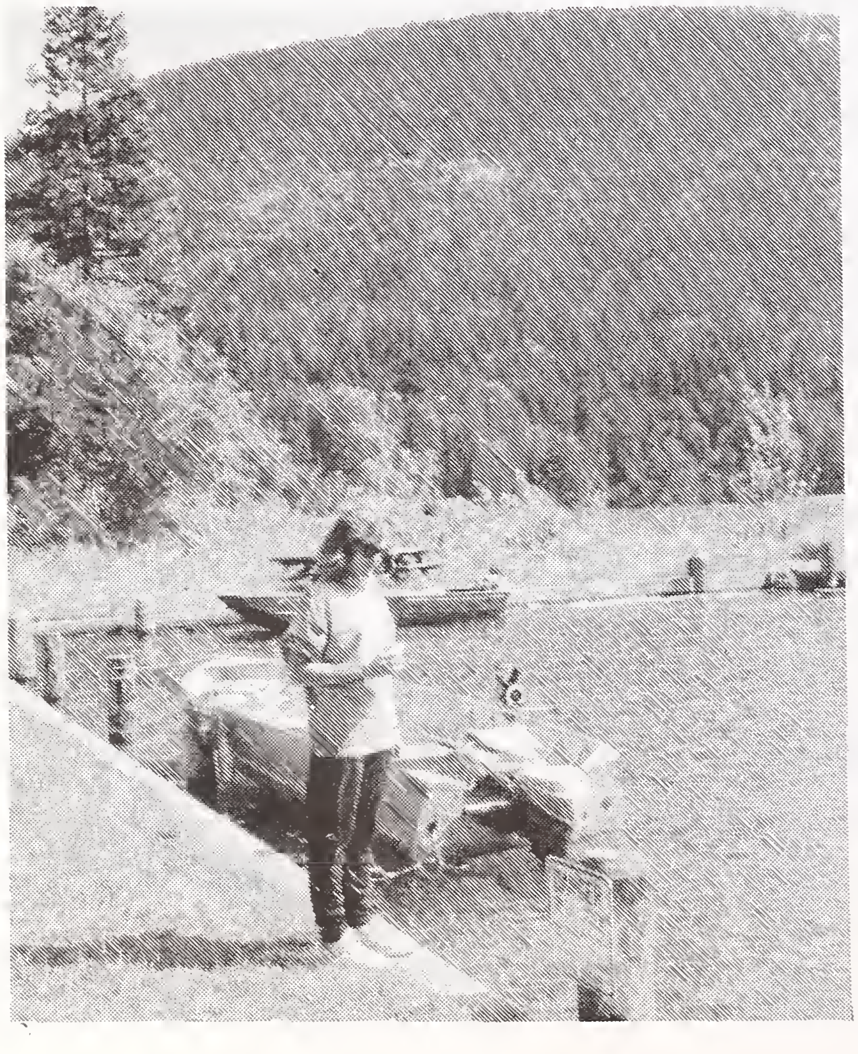
WATER QUALITY BUREAU - ROOM A201
1400 BROADWAY
P. O. BOX 200901
HELENA, MT 59620-0901

ANNUAL YELLOW BAY CONFERENCE

Phosphorus Removal Workshop

◂Dr. Bill Oldham, University of British Columbia, explains Biological Nutrient Removal to workshop participants. (Hey, how does Todd get in ALL the pictures??)

Jar testing at the Yellow Bay laboratory has the participants' attention. ▸



◂♪♫"It's a beautiful day in the neighborhood," ♫♪ for Karen Bucklin Sanchez during a break at the workshop.

Fifty-Ninth Annual Water School

The water school was bursting at its seams last fall in Bozeman with the attendance of 220 water and wastewater operators and managers. The week-long session was held October 5-9, 1992 at Montana State University. Over 100 people took the examinations on Friday. It was a great school. "Thanks" to the attendees and the speakers. See you next fall.

Tim Hunter and the elusive Vorticella (just prior to the First Annual Sludge Bowl).

Karen Bucklin Sanchez and Doris Roberts working out last-minute details of the laboratory session.

Several "happy-to-be-photographed" attendees.

Final Sludge Regulations

(40 CFR Part 503)

by Paul LaVigne, WQB

In 1972, the Clean Water Act mandated that the EPA develop and publish guidelines for the disposal and utilization of municipal sewage sludge. These guidelines, published in 1979, took the form of 40 CFR Part 257 and have governed the use and disposal of municipal sewage sludge to this point. With regard to land application of sludge, the Part 257 rules set specific limitation on cadmium and polychlorinated biphenyls (PCBs), in addition to requirements for pathogens and vector control. On February 4, 1987, the Clean Water Act was amended to require EPA to identify toxic pollutants which may be present in sewage sludge, and to promulgate regulations which contain: 1) numeric limitations for those toxic pollutants, and, 2) acceptable management practices for sludge use and disposal.

On November 25, 1992, the Final Rule on the standards for the use and disposal of municipal sewage sludge was signed by EPA. The scientists, engineers and others who were instrumental in the development of the Rule considered air pollution, surface and ground water pollution, soil contamination and human health concerns. The Part 503 Rule establishes standards for management practices, operational standards, monitoring, recordkeeping, and reporting. The Rule also establishes limits for ten metals, pathogens, PCBs, and cumulative and annual loading rates for land application of municipal wastewater sludge and domestic septage.

Within 120 days of the publication of the Part 503 Final Rule in the Federal Register (expected date of publication is late January, 1993), any person who prepares sewage sludge, applies sludge to the land, incinerates sludge, or who operates a surface disposal site must begin monitoring, recordkeeping and reporting as specified in the Rule. Facilities must comply with the entire Rule within one year unless construction is required, in which case the compliance period is two years.

The Rule establishes ceilings for concentrations of ten metals. Two ceilings are established: one for "clean" sludge and another for maximum metal concentrations above which the sludge may be classified as hazardous waste and cannot be land applied. Most of the sludges in Montana are expected to fall under the clean sludge category. The ceiling concentrations for the ten metals in clean sludge are (in milligrams per kilogram on a dry weight basis):

Arsenic	- 41
Cadmium	- 39
Chromium	- 1200
Copper	- 1500
Lead	- 300
Mercury	- 17
Molybdenum	- 18
Nickel	- 420
Selenium	- 36
Zinc	- 2800

In addition to classifying the sludge as clean or otherwise, the Rule also classifies the sludge as Class A or Class B with respect to pathogens. There are several alternative pathogen requirements listed in the Rule. Here is one alternative for Class A sludge: The Rule states that, at the time the sludge is used or disposed, prepared for sale, or given away, the density of fecal coliform bacteria shall be less than 1000 Most Probable Number (MPN) per gram of total solids, **or** the density of Salmonella bacteria shall be less than three MPN per four grams of total solids. In addition to the above requirement, the temperature of the sludge shall be maintained at a specific value for a period of time. The specific time and temperature requirements depend on the solids content of the particular sludge. Class B sludge is a lower quality sludge with respect to pathogens. Under one of the alternative pathogen requirements for Class B sludge, the maximum allowable fecal coliform density is 2,000,000 Colony Forming Units (CFUs) per gram of total solids. Another alternative for Class B sludge is the treatment of the sludge by one of the Processes to Significantly Reduce Pathogens. Certain site restrictions and management practices apply to land on which Class B sludge is applied.

In addition to the pathogen criteria mentioned above, the sludge must meet the Vector Attraction Reduction requirements established in the Rule. There are 12 options for vector attraction reduction. The one chosen depends on whether the sludge is Class A or B and it depends on the proposed final application or disposal method. An example of a vector attraction reduction requirement would be a minimum reduction of 38 percent in the mass of volatile solids. An alternate requirement would be to raise the pH of the sludge to 12 or higher (by alkali addition) for two hours and then at pH 11.5 for an additional 22 hours. No additional alkali may be added during the 24-hour period. Remember these specific examples do not apply to all sludges or to all application methods.

The Part 503 Rule applies not only to municipal sludge, but also to domestic septage. For example, the Rule states that the maximum annual application rate for domestic septage applied to agricultural land, forest, or a reclamation site is determined by dividing the amount of nitrogen, in pounds per acre per year as needed by the particular vegetation, by 0.0026. This gives the annual application rate in gallons per acre per 365-day period. The septage hauler who land-applies the septage, must meet the site restriction requirements or raise the pH of the septage above 12 by alkali addition and the pH must stay above pH 12 for 30 minutes without further alkali addition. If the pH adjustment is made, site restrictions still apply when the septage is applied to food crops. Each container of septage must be monitored for adherence to the above requirements and the hauler must certify that the requirements are met.

Sludge which is disposed of in a licensed municipal solid waste landfill will continue to be regulated by the Part 257 regulations until October 9, 1993 when these regulations shall be preempted by the Part 258 regulations: "Criteria for Municipal Solid Waste Landfills."

This article has illustrated only a few rules and alternatives in a very comprehensive set of regulations. The Part 503 Rule will be in effect as of the date of publication in the Federal Register. The expected date of publication is sometime in late January, 1993. Facilities, septage haulers, and other applicable folks will have only 120 days in which to begin monitoring, recordkeeping and reporting. EPA has given one year in which to be in full compliance with the Rule (two years if construction is required). The Rule is relatively straightforward but also very comprehensive.

We will all be learning as we go, so please bear with us in the early stages of the implementation of these regulations.

METC will be sponsoring two sludge workshops early this spring. There will be a workshop in Billings on February 25, 1993 and one in Missoula on March 4, 1993. For answers to specific questions regarding sludge disposal, contact Paul Montgomery of the EPA (449-5486) or Paul LaVigne of the Water Quality Bureau (444-5321).

USE THAT DATA

by Bill Bahr, WQB

A plant sampling program, properly designed and carried out, will generate **RAW DATA** that will be used to make important decisions about the plant. Depending on the purpose of the samples collected, the data may be used for process control, process monitoring, process performance evaluation, future design considerations, enforcement action responses, or a variety of other purposes.

Transforming raw data into a useful and manageable form without altering or masking the results is a crucial step in the plant sampling program. This discussion will be limited to more basic considerations because of the limited space and format. It is recommended, however, that further study be made concerning the statistical implications and applications of the data generated at water and wastewater plants.

DATA REDUCTION

Significant figures. This aspect indicates the **accuracy** of the numbers recorded. A lot of decimal points do not make a recorded value more accurate. Record all digits that are known to be correct, plus one more in which there is some degree of uncertainty. Thus, 18.16 is a number with **four** significant digits, and is known accurately to the first decimal place. Rules governing significant figures of a data point are:

- All digits that contain a nonzero integer (everything but zeros in a number) are significant. Six (6) has one significant figure, 24 has two, and 39.8 has three.

- Zeros bounded on each side by nonzero integers are significant. Thus, 1001 has four significant figures.

- Zeros after a decimal point which is preceded by a nonzero integer are significant. 7.600 has four sig. figures.

- Zeros after a decimal point not preceded by a nonzero integer are indicating position of the decimal and are not significant. Thus, 0.067 has two sig. figures and 0.0670 has three.

- Zeros following a nonzero integer and preceding the decimal point may or may not be significant. Their accuracy depends on the source of the data, experimental accuracy, or other factors. For example, 1000 may have one or four sig. figures. By convention, inserting a zero after the decimal point brings significance to it and all preceding integers. Thus, 1000.0 has five significant figures.

ROUNDING NUMBERS

Data gathering yields a variety of numbers with a variety of significant figures. It is necessary to round off at some point to the appropriate number of figures. The rules for rounding off are:

- If the number following the digit to be rounded off is greater than five (5), raise the digit to the next higher number. For example, 46.76501 rounded to four significant figures would be 46.77, since 501 is larger than 500.
- If the number following the digit to be rounded off is less than five (5), leave the digit unchanged. Thus, 46.76499 rounded to four significant figures is 46.76.
- If the number following the digit to be rounded off is equal to five (5), the accepted procedure is to **raise odd** digits to the next higher number, and leave **even** digits **unchanged**.
- Rules of rounding also apply to the mathematical operations being conducted. **The end result of rounding is to get a final number with no more significant digits than that of the least accurate number.** Rounding is done after adding, multiplying, and dividing. Rounding is done before subtracting. Avoid rounding off until after a series of operations is complete.

REDUCTION OF RECORDED DATA

To derive continuously recorded data as a single point, for example, average daily flow, dissolved oxygen, conductivity, and pH, follow these steps:

- Divide the period in question (often 24 hours) into a number of equal intervals. More intervals are better for information that varies widely, while fewer are necessary for relatively constant parameters. Hourly intervals are adequate for flow.
- Visually evaluate the average value for each time interval as accurately as possible and record it.
- Sum all the values recorded for the period in question.
- Divide the sum by the number of intervals used.
- Round the result to the number of significant figures of the various data points.

REDUCTION OF DATA POINTS

Useful data lies in the ability to evaluate the information in a way that is useful to you. In order to see the forest in the trees, data must be manipulated and modified to a useful form. The following are common methods for reducing many data points:

- MEDIAN} The median value for a rank-ordered series of data points is **the middle value** of the series. That is, an equal number of values lie above and below the median when all the values are placed in order from smallest to largest.

- RANGE} A listing of the **maximum and minimum** values of a series of data points. The range of pH is an example.

- AVERAGES} The **average, or mean,** represents the average set of conditions over the period considered. There are different kinds of averages or means, depending upon application.

    - The **Arithmetic Mean** is the most commonly used average, and is calculated by taking the sum of all the data points and dividing this sum by the total number of data points.

    - A **Weighted Average** is a modified mean that is used with data points of different levels of importance. Used often with concentrations of samples collected at different flow rates. This mean is calculated by multiplying each value by a weighting factor before summing, and then dividing by the sum of the weighting factors.

        For example: A river with a flow of 300 mgd and a suspended solids concentration of 1.5 mg/l receives a discharge of 25 mgd from a treatment plant. What is the suspended solids concentration in the river below the plant if the plant effluent suspended solids concentration is 28 mg/l?

$$\text{Weighted average} = \frac{(300\text{x}1.5)+(28\text{x}25)}{300+25}$$

$$=\frac{1150}{325}$$

$$=3.54 \text{ or } 3.5 \text{ (round to two figures)}$$

- A **Geometric Mean** is used to evaluate data that varies by much more than a factor of 10 or 20, like the fecal coliform count. To calculate, do the following:

    1. Convert each data point to its logarithmic equivalent. (Use your pocket calculator.) All zeroes equal one (1). The numbers will look like this: 4.69897. This actually is log5.0x10^4. Logarithms can be added or subtracted and have other mathematical functions performed on them.

    2. Sum the logarithms of all the data points.

    3. Divide the sum by the number of data points.

    4. Take the antilog of the result. (Use your pocket calculator.) This is the geometric mean.

    Remember, convert all zero values to one, drop any greater than and less than symbols and use the value, and drop all values that are TNTC (too numerous to count).

    Also, tables can be set up to help simplify the determination of the geometric mean.

- Systems that require time periods to respond, like biological systems, have parameters that need to be evaluated after a specified period has passed. **Moving Averages** can be constructed over the period to help provide valuable operational information. Seven-day moving averages are the most common. For example, the seven most recent daily values for the SVI are summed, and divided by, in this case, seven. The next day, the oldest SVI is dropped and the current SVI is included in the sum. Thus, the number of SVI values to be summed is always seven, and they are the most recent seven. The sum is always divided by seven in this example.

Data can be graphed to show trends or make comparisons. Probability can be predicted though plotting data against other data. Quality control and statistical evaluation using data points are possible. Accuracy, deviation, precision and regression are all terms that exist in statistical analysis, which allows us to use data. Those concepts and applications are subjects for further study.

For now, it is important enough to remember these basic methods for gathering, recording and preparing plant data for use.

1993
1st ANNUAL SPRING WATER SCHOOL
SMALL SYSTEMS

WEDNESDAY - MARCH 10

Joint Sessions (Room C)

7:30 am	-	8:30	Registration
8:30	-	9:00	Miles City Welcome, Mayor George Kurkowski and the Montana Environmental Training Center
9:00	-	9:30	Operator Certification and Operator Ethics
9:30	-	10:15	Water and Wastewater History
10:15	-	10:30	Break
10:30	-	11:15	Montana Enforcement Cases "Repairing the Past, Protecting the Future"
11:15	-	12:00	Communication With Your Public and Your Administrators
12:00 pm	-	1:00	Lunch

Concurrent Sessions

Filtered Water (Room C)

1:00 pm	-	1:45	Treatment and Coagulation Overview
1:45	-	2:30	Jar Testing Demonstration
2:30	-	2:45	Break
2:45	-	4:30	Jar Testing Workshop and Discussion

Groundwater/Distribution (Room A)

1:00 pm	-	2:00	Groundwater and Drought
2:00	-	2:30	Intro to Wellhead Protection
2:30	-	2:45	Break
2:45	-	3:15	What's New in Groundwater
3:15	-	4:30	LUST Program

Wastewater (Room B)

1:00 pm	-	2:30	Wastewater and Treatment Overview
2:30	-	2:45	Break
2:45	-	4:30	Lagoons - Biology, Types, and Operation

Joint SOS Session (Room C)

4:30	-	5:30	SOS Materials Handout and Session

THURSDAY - MARCH 11

Joint Sessions

8:00 am	-	10:00	Room A - Gas Chlorine Safety and Repair Kits Room B - HTH Safety and Mandatory Disinfection
10:00	-	10:15	Break
10:15	-	11:30	Room C - Safety and Maintenance

Special Lunch Presentation - METNET
Educational Possibilities with Telecommunications
(11:30 - 12:30 Lunch Included)
At the Miles City Community College, Room ***

Concurrent Sessions

Filtered Water (Room C)

1:00 pm	-	2:15	CT Determination: Principles and Calculations
2:15	-	2:30	Break
2:30	-	3:30	Reporting Requirements for Filtered Surface Water Supplies - New Forms
3:30	-	4:30	Turbidimeter Calibration and Chlorine Residual Analyzers

Groundwater/Distribution (Room A)

1:00 pm	-	1:45	What To Expect When We're Inspecting
1:45	-	2:15	Iron Bacti and Other Montana Groundwater Problems
2:15	-	2:30	Break
2:30	-	3:15	Tank and Main Disinfection
3:15	-	4:30	Valve and Fire Hydrant (Maint. and Leak Det.)

Wastewater (Room B)

1:00 pm	-	1:30	Sampling - Process Control and Permits
1:30	-	2:15	Flow Measurement and Laboratory Analysis
2:15	-	2:30	Break
2:30	-	4:00	Collection Systems - Maintenance, Safety, and Television Inspections
4:00	-	4:30	Trenching Safety - An Overview

SOS Sessions (Rooms A, B, and C) 4:30 - 5:30

FRIDAY - MARCH 12

Joint Water (Room C)

8:00 am	-	9:00	Coliforms
9:00	-	9:30	Lab Analysis (Film)
9:30	-	9:45	Break
9:45	-	10:30	Lead and Copper Rule
10:30	-	11:15	Phase II and V (SOCs, IOCs, VOCs)
11:15	-	12:00	Mandatory Disinfection, Upcoming Regulations, Questions and Answers

Wastewater (Room B)

8:00 am	-	9:30	Sludge - New Regulations and Small Systems Needs
9:30	-	9:45	Break
9:45	-	10:45	Wastewater Responsibilities, Laws, Regulations, and Permits
10:45	-	12:00	Computer Assistance for Maintenance, Reports, Logs, Trend Charts, etc.

12:00 - 12:30 Wrap-Up and Adjourn (Room C)

PLAN REVIEW EXPEDITED
FOR WATER AND SEWER MAINS

by Dave Aune, WQB

The Water Quality Bureau has completed the Water Main Certified Checklist and the Sewer Main Certified Checklist. These checklists may be used to expedite the review process by certifying compliance with state design standards. The department will not review the plans when such certification is received and plans to issue approval letters within 10 working days of receipt of the checklist.

The department will perform periodic quality control reviews to ensure compliance with the standards and has placed certain limitations on the use of the certified checklists.

For water or sewer extensions - the use of the checklist is **limited** to those systems that have professional engineers on staff; or to those systems that have developed water utility master plans.

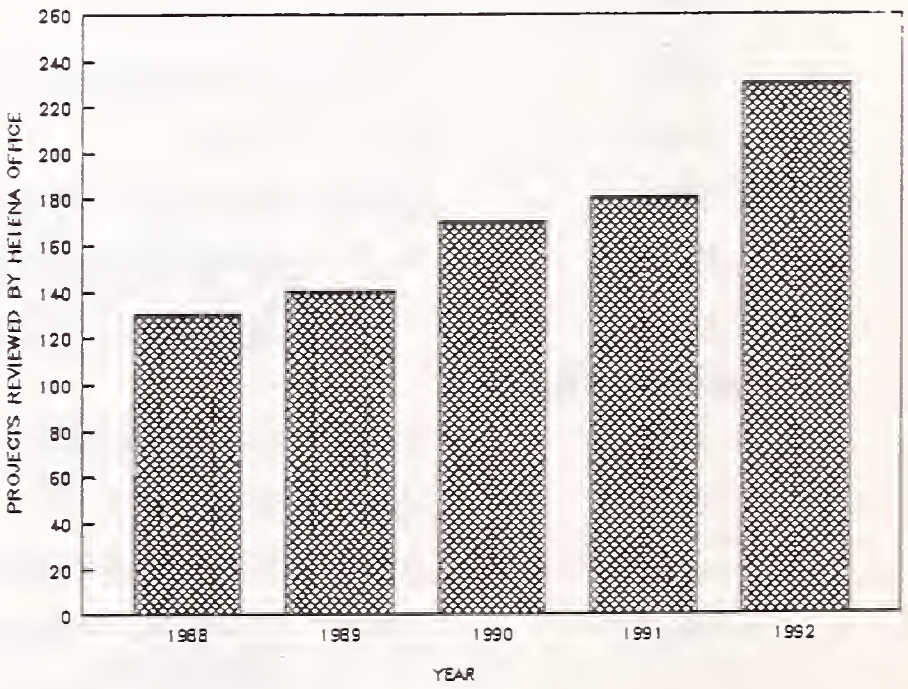
For water or sewer replacements - all systems may use the certified checklists provided that the replacement pipe diameter is equal to, or greater than, the diameter of the existing pipe and that an approval letter from the owner of the system providing service to the water or sewer replacement is submitted with the checklist.

The department is currently revising the sewer works standards, but it looks like it may be another year or so before the work is complete. At that time, the sewer main checklist will have to be revised.

Hopefully, these checklists will prove to be useful for expediting plan review and improving turnaround time, even for those who cannot apply them directly.

Any effort to reduce the plan review workload will improve turnaround for all. As the graph illustrates, the number of projects reviewed in the Helena office has increased dramatically in recent years and that, combined with the increasing demands of the Safe Drinking Water Act, has really put on the squeeze.

Let's give the checklists a try and see how they work. For more information on these checklists, please call the Water Quality Bureau at 444-4549.



Meeting Disinfection Requirements
or
What the Heck is CT Anyway?

by Marcus J. Golz, WQB

In its implementation of the Surface Water Treatment Rule, Montana must require all public water supplies using surface water or groundwater under the direct influence of surface water to meet minimum disinfection requirements. The minimum disinfection requirements are defined in Administrative Rules of Montana (ARM) 16.20.208. The rule requires that these systems achieve 4-log removal/inactivation of viruses and 3-log removal/inactivation of Giardia cysts. For most systems, achieving 3-log removal/inactivation of Giardia cysts also takes care of the 4-log virus requirement because viruses are more susceptible to chlorination than are Giardia cysts.

What is meant by 3-log and 4-log removal/inactivation? 3-log removal/inactivation means that if a certain quantity of water contains 1,000 Giardia cysts, 99.9 percent of them (999 cysts) would be removed or inactivated by the treatment process. Similarly, 4-log removal means that if a certain quantity of water contains 10,000 viruses, 99.99 percent of them (9,999 viruses) would be removed or inactivated by the treatment process. We must assume that untreated surface water does or may contain these levels.

Surface water systems which do not provide filtration treatment must achieve the entire 3- or 4-log removal via disinfection. For unfiltered surface water systems, the details for determining and reporting compliance can be found in Department Circular PWS-3.

Surface water systems providing filtration treatment must meet **a portion** of the 3- or 4-log removal/inactivation via disinfection. For systems which are well operated and consistently in compliance with the turbidity MCL's for individual filters and the clearwell, the following table will be used to determine the log removal credit given for the type of filtration treatment practiced. The log removal required of disinfection can then be found by subtracting the log removal credit for filtration from the 3-log Giardia removal/inactivation required.

	LOG REMOVAL CREDIT		*LOG INACTIVATION REQUIRED OF DISINFECTION*	
TYPE OF FILTRATION	GIARDIA	VIRUS	GIARDIA	VIRUS
CONVENTIONAL	2.5	2.0	0.5	2.0
DIRECT, INCLUDING SYSTEMS EMPLOYING CONTACT ADSORPTION CLARIFICATION	2.0	1.0	1.0	3.0
SLOW SAND	2.0	2.0	1.0	2.0
DIATOMACEOUS EARTH	2.0	1.0	1.0	3.0
OTHER	2.0	2.0	1.0	2.0

For example: A surface water plant operates in the direct filtration mode part of the year and as a conventional plant during the remainder of the year. While operating in the direct filtration mode the plant receives 2.0-log removal credit for Giardia and 1.0-log removal credit for viruses for the filtration part of the treatment. The system must therefore achieve 3.0 - 2.0 = 1.0-log inactivation of Giardia and 4.0 - 1.0 = 3.0 log inactivation of viruses by disinfection, while operating in the direct filtration mode. In the conventional mode, the plant would receive 2.5-log removal credit for Giardia and 2.0-log removal credit for viruses.

Log inactivations have been experimentally and statistically equated to CT values. These values are compiled in a series of tables, according to the temperature of the water (and pH when chlorine is used as a disinfectant). To determine compliance a system needs to calculate the CT which is being achieved by the plant (CT_{calc}) and compare it to the required CT ($CT_{required}$) from the applicable table.

"C" is simply the disinfectant residual, in parts per million, measured at the exit or outflow from a unit. In most cases the point of measurement will be at the outflow from a contact basin or clearwell. "T" in the calculation is synonymous with "T_{10}". "T_{10}" is a measure of the time at which ten percent of the flow can break through, via short circuiting, a unit such as a clearwell.

"T_{10}" can be estimated by calculating the theoretical hydraulic detention time and applying a correction factor which accounts for short circuiting and is based on the baffling characteristics of the unit, or by conducting tracer studies on the unit in question. The actual value of "T_{10}" is computed by dividing the effective volume of the unit by the peak hourly flow rate.

Tracer studies involve continuously feeding or dumping an NSF **approved** chemical into the water supply prior to the unit being studied, and monitoring the concentration of the tracer in the effluent. The time it takes for ten percent of the chemical (or total concentration) to pass through is defined as "T_{10}". The use of tracer studies is probably the most accurate way to determine "T_{10}". Systems are encouraged to use tracer studies, since the estimated value will most likely and hopefully be conservative.

Finally, the "C" is multiplied by the "T_{10}" and the resulting value is the CT_{calc} for the system for that day. CT_{calc} is then compared to the required CT ($CT_{req'd}$) from the appropriate table. The method of comparison is to calculate the "inactivation ratio" which is the value of the calculated CT divided by the require CT. Expressed as an equation: Inactivation Ratio = $CT_{calc} \div CT_{req'd}$. The inactivation ratio must be greater then or equal to 1.0 for the system to be in compliance with the disinfection requirement.

For systems which do provide filtration treatment the department plans to detail the requirements in a new DHES Circular PWS-4. This circular should be available for review soon. Keep in mind - the overall treatment requirements are essentially the same for unfiltered and filtered systems. It is just that filtered systems achieve some of the removal/inactivation of pathogens by the filtration process. Therefore, they have a lower inactivation requirement for the actual chemical disinfection part of the overall treatment.

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CHECK YOUR IN-LINE TURBIDIMETER ?

by John Camden, WQB

Recently the City of Thompson Falls experienced a turbidity event of over 5.0 NTU's for an unfiltered water system avoiding filtration. City personnel reported the event to WQB and had checked the surface water supply for disturbances. When making the weekly preventative maintenance check of their Hach 1720C turbidimeter, the operator found the aperture plate floating on top of the water supply. The two screws holding the aperture plate in place had corroded.

Hach Company has contacted the Water Quality Bureau in writing about this malfunction. Hach has been aware of the potential for corrosion to the screws holding the aperture plate and made an engineering change a couple of years ago replacing the metallic screws with nylon screws. By lifting the head an inspection can be made of the screws. The screws can be replaced by either calling the Hach Company or going to your local hardware store.

The function of the aperture plate is to columnate the light beam. Without the aperture plate in place, the light beam will have a conical shape rather than cylindrical shape. The resulting cone of light will flood the instrument's photocell causing false high measurements.

If you should have questions concerning the aperture plate, contact your local Hach representative.

CROSS CONNECTION CONTROL

by Marcus J. Golz, WQB

The Safe Drinking Water Act says that the supplier of water is responsible for the quality of water at the consumers tap. This responsibility has led to civil actions where cross connections were implicated as the smoking gun and water suppliers as the bad guy. In some cases large settlements have been awarded for damages.

Rightly so, the burden for preventing cross connections lies squarely on the shoulders of the water supplier. There are many, many examples where cross connections have caused serious health problems, and despite this fact, most of the water utilities in Montana do not have a cross connection control program. This may be due, in part, to the perception that Montana doesn't have to worry because it doesn't have the level of commercial development found in other parts of the country. This view is not accurate. A review of the cross connection literature, including cross connection case histories, reveals that Montana public water supplies are no less susceptible to containing cross connections with serious health risks than public water supplies anywhere else.

The argument can be made that the raw number of cross connections in Montana is probably less than elsewhere, but it would be reasonable to speculate that the number of cross connections in Montana relative to the size of the utility is similar to that found anywhere.

In order to protect public health and promote the delivery of safe drinking water, the Department of Health and Environmental Sciences is looking at amending the Public Water Supply Rules to require public water supplies to develop and maintain cross connection control programs.

Several programs from other states were reviewed and a rough draft of the rule was recently written and is currently being reviewed by the department.

The intent, at this point, is to hold public water suppliers responsible for developing their own cross connection control programs with a minimum of oversight from the department. The rule would require cross connection control programs to contain certain minimum elements described in the rule. It would probably require that cross connection control programs be submitted to the department.

The rule will hopefully be ready for public review and comment sometime in 1993. In the meantime public water suppliers are encouraged to identify and eliminate cross connections where possible and provide protection where not. Also, groundwater systems that do not currently disinfect should note that a cross connection control program will be helpful when pursuing avoidance of mandatory disinfection, expected from EPA in 1996.

NEWS . . . ABOUT CERTIFICATION

by Rosemary Fossum, Certification Officer

THE FOURTH TRAINING BIENNIUM WHICH BEGAN JULY 1, 1992, DOES NOT END UNTIL JUNE 30, 1994. Many operators have already attended Water School at MSU or one of the 24 training seminars presented since July 1. If you've no CEC's to date, consult the 1993 MONTANA TRAINING CALENDAR for training options this year. Supplementing the calendar, notices relating the time/place/agenda of individual seminars are sent to operators in zip-code proximity of a seminar. If you don't get a notice for a seminar which interests you, call the certification office at 444-2691 or the METC office at 761-0417 for the information. If you **really** study your calendar from stem to stern, you'll find most of the info on certification and training requirements are listed there!

THE WATER AND WASTEWATER OPERATOR CERTIFICATION ADVISORY COUNCIL welcomes James Worthington, Public Works Director of the City of Laurel, to a term on the council ending October 16, 1998. He fulfills the requirements specified in MCA 2-15-2105(d) for "one (council) member who is a representative of a municipality required to employ a certified operator and who holds a position of either city manager, city engineer, director of public works, works manager or their equivalent." A Montana native, Mr. Worthington was a consulting engineer for thirty years before taking his current position with the City of Laurel.

BLESSINGS AND HONOR TO GARY SMITH, CUT BANK'S PWD, UPON COMPLETION OF TWO TERMS ON THE COUNCIL. The council's role is to advise and assist the department in actions relating to the qualifications of certified operators. Over the years, Gary was a strong catalyst for steps to improve the quality of the operator through upgrading certification examinations and requirements, and instituting continuing education requirements.

CERTIFIED OPERATORS SHOULD KNOW AND ACT TO UPHOLD THESE LAWS:

MCA 37-42-3021 states that it is unlawful for a person, firm, or corporation, both municipal and private, to operate water or wastewater systems unless the operator is certified. Why? To protect the water which people drink and which goes into our streams.

ARM 16.18.206(1) requires water and wastewater systems to have a certified operator in responsible charge at the facility site or on call at all times who can be contacted immediately and be at the site within a short period of time. Why? To make sure the certified operator is a "hands-on" operator.

MCA 37-42-307(2) requires any person, firm, or corporation, both municipal or private, to notify the department within three business days if a certified operator terminates employment. Why? To avoid time periods when systems are without fully certified operators.

ARM 16.20.242 requires water suppliers for community water systems to designate a contact person who shall be responsible for matters relating to system alteration and construction, monitoring and sampling, maintenance, operation, recordkeeping, and reporting. This contact person must be certified. Why? Because these duties are, in fact, those of a certified operator.

ARM 16.20.217(5) requires that measurements for pH, temperature, turbidity, and residual disinfectant concentrations, or for samples for total coliform analysis for community water supplies must be conducted by a certified operator. Why? Because sampling is, in fact, the duty of the certified operator. **Systems dividing these duties among several individuals should know that ALL require certification.**

MATH REVIEW FOR CERTIFICATION EXAM

Sponsored by

WATER QUALITY BUREAU
March 12 and March 19, 1993
6:30 - 9:30 p.m.

1. HAVRE (March 19)
   Northern Montana College
   Room 103-4
   Hagener Science Center

2. MILES CITY (March 12)
   Historic Ursuline Convent Building
   Largest Room
   1411 Leighton Boulevard

3. HELENA (March 12)
   Cogswell Building
   Room C-209 - Side 2
   (Use Broadway entrance)

4. GREAT FALLS (March 12)
   NMC Great Falls Center
   Room 101
   1211 Northwest Bypass

5. MISSOULA (March 12)
   Holiday Inn-Missoula Parkside
   Hook-Autio Room
   200 South Pattee

6. KALISPELL (March 12)
   Outlaw Inn
   Hideout Room
   1700 Highway 93 South
   (Downstairs, south entrance)

7. Billings (March 12)
   Eastern Montana College
   Liberal Arts Building, Room 527
   (Tallest building on campus)

* *

This session is intended to review basic math with those people taking exams on March 13 or March 20, 1993. The review will begin at 6:30 p.m.

NOTE: The locations for the Kalispell and Missoula review sessions are not the same as for the certification exams in those communities.

For more information call: Rosemary Fossum, Water Quality Bureau, 444-2691.

EXAMINATION NOTICE

IN SIX LOCATIONS – SATURDAY, MARCH 13, 1993 – 9:00 A.M.
IN HAVRE ONLY – SATURDAY, MARCH 20, 1993 – 9:00 A.M.

Examinations for certification as a Water Distribution Systems Operator, Water Plant Operator, and Wastewater Plant Operator will be given at these locations:

BILLINGS	Room 527; Liberal Arts Bldg. (tallest building on campus); EMC (Eastern)
GREAT FALLS	Room 101; NMC Great Falls Center; 1211 NW Bypass (8 blocks W of Shopko)
HELENA	Room C209-Side 2; Cogswell Building (use entrance from Broadway)
KALISPELL	Room 132-3; Bus/Soc. Sci. Building; Flathead Valley College; 777 Grandview Dr.
MILES CITY	Largest Room; Historic Ursuline Convent Building; 1411 Leighton Boulevard
MISSOULA	Large Basement Room, Missoula City/County Library; 301 East Main
HAVRE	Room 103-4; Hagener Science Center; Northern Montana College (March 20, 1993)

By February 26, as required by ARM 16.18.204, everyone taking examinations must have:

-- Completed an application for certification as a water/wastewater operator.
-- Paid application (or renewal) fees for fiscal year 93 which ends 6/30/93.
-- Submitted examination registration slips and fees of $5 per examination.

APPLICATION FEES ARE: $30 per either or both water distribution or water treatment type and classification; and $30 per any wastewater type and classification.

To request application materials, order study materials, or ask for additional information, call the certification office at 444-2691 or write:

Water/Wastewater Operator Certification
Water Quality Bureau - 1400 Broadway - P.O. Box 200901
Helena, MT 59620 (Phone: 444-2691)

PLEASE RETAIN THE UPPER PORTION OF THIS NOTICE.

EXAMINATION REGISTRATION SLIP

(Detach and return with $5 per examination by February 26, 1993)

I will take the examination(s) I have checked below at: _____ Billings; _____ Great Falls; _____ Helena; _____ Kalispell; _____ Miles City; _____ Missoula; _____ Havre;

	1	2	3	4	5
A - Water Distribution	_______	_______	_______	_______	
B - Water Plant	_______	_______	_______	_______	_______
C - Wastewater Plant	_______	_______	_______	_______	

***Combination examination 2A3B, 3A4B, 4A4B and 5A5B require $5 examination fee only.**

NAME: ________________ **ADDRESS:** ________________ **SYSTEM:** ____________

PASSING EXAMINATIONS FOR FULL CERTIFICATION OR OPERATOR-IN-TRAINING (OT) 10/9/92

Class 1:

Peter Burtchell, Norfolk,Va-1B-ot*
John Clark, Anaconda 1C-ot
Douglas Cunningham, Helena, 1B
James Dennehy, Butte, 1A
Kevin Dourocher, Havre, 1A-ot;1B-ot
Thomas Edwards, Bozeman 1C-ot
Jay Frandsen, Helena, 1A-ot*
Martin Hovan, Butte, 1B-ot*
Sherrie Kenyon, Missoula, 1C
Daryl Keys, Fort Peck, 1B
Ron Littlelight,C.Agency, 1B
Keith Mainwaring, Bozeman, 1A
Todd Miller, MAFB, 1A-ot*
James Morrison, Laurel, 1B-ot
Gerald Petersen, Bozeman-1B-ot*
Christine Poppe, Bozeman, 1A-ot
Tim Rhodes, Missoula, 1C
Dean Stiffarm, Fort Belknap, 1B
Kevin Strickler, Bozeman, 1A-ot

Class 2:

George Beyer, Bigfork 2B-ot*
Travis Dolphin, Polson, 2A
James Gillan, Missoula, 2A3B-ot*
Duane Martian, Conrad, 1B-ot
Steven Moore, Culbertson, 2A-ot*
David Szeszyck, Hamilton, 2A3B
Daniel Thede, Libby, 2C-ot

Class 3:

Wesley Berr, Fromberg, 3C
Ralph Corbett, Winnett, 3C
Robert Desrosier, Browning, 3A4B,3C
D.Ellsworth,White Sulphur Spgs,3A-ot
Timothy Farwick, Fort Benton, 3C*
John Field, Big Sandy, 3C*
Lynn Gieschen, W. Yellowstone,3C-ot
Roy Hungerford, Whitehall, 3C-ot*
Eric Mayer, MAFB, 3C
Carl Nelson, Deer Lodge, 3A4B,3C
James Nessen, Absarokee, 3A4B
Dennis Osterman, Belt, 3A4B, 4C
Daniel Racine, Browning, 3C*
William Ryan, Deer Lodge, 3A4B
Michael Scholz, Big Sky, 4AB,3C
Dean Stiffarm, Fort Belknap, 3A
Wayne Turner, Big Sandy, 3C*
J. Warden, Whitehall, 3A4B-ot;3C-ot
Cecil Worsley, Fort Benton, 3A4B-ot

Class 4:

Ralph Corbett, Winnett, 4AB
W.Cornelius, Great Falls, 4AB
Leland Flath, Whitehall, 4AB
Glenn Hockett, Bozeman, 4AB
Kelley Jones, Belle Creek, 4AB,4C
Robert Koby, Bozeman, 4C
Burr Lively, Melrose, 4C-ot
Steven Moore, Culbertson, 4C
Beverly Pepos, Stockett, 4C-ot*
Tom Russ, Clancy, 4AB-ot, 4C-ot
Susan Sillick, Chester, 4C-ot
Robert Spevacek, Geraldine, 4AB-ot,4C-ot
Earl A. Stagg, Boulder, 4C
Donald Wade, Hobson, 4C-ot

Class 5:

William Cornelius, Great Falls, 5AB
Tom Drews, Belgrade, 5AB
George Waldner, Cut Bank, 5AB

* Denotes those previously certified in another classification type.

Water Quality Bureau
Department of Health and
Environmental Sciences
1400 Broadway
P. O. Box 200901
Helena, Montana 59620-0901

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